

**ETHICAL AWARENESS  
AMONGST ENGINEERING STUDENTS  
IN MALAYSIAN PUBLIC UNIVERSITIES**

**(KESEDARAN ETIKA  
DI KALANGAN PELAJAR KEJURUTERAAN  
DI IPTA MALAYSIA)**

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# **CHAPTER 1**

## **INTRODUCTION**

## 1.1 Introduction

The area of ethics has received increased attention from the private and public sectors as well as academics over the past several decades. In the West, the highly publicized incidents at Enron and Arthur Anderson as well as WorldCom have brought the topic of ethics particularly business ethics to the public's attention. There have been a multitude of scandals in the government, business and other areas of national life which includes the unethical conduct of top executives on Wall Street related to insider trading, the suspected misuse of research grants at Stanford University and a few other incidents captured by the media. In Malaysia, two general managers of the National Pilgrimage Board (LTH) had been charged in court for breach of trust by withholding information that could affect the decision not to invest RM400 million in foreign exchange activities (The New Straits Times, 15 February, 2003). The Malaysian government was also aware that one of the reasons for the failure of some government-linked companies was due to dishonest officers (The New Straits Times, 25 August, 2005). All these incidents clearly indicate the extent unethical practices played by business executives and managers worldwide. They also show that unethical behavior is costly to corporations, employees and their investors. As a result, business organization and professional associations have established and are enforcing stricter code of ethics.

Many of the 21<sup>st</sup> century managers have received their professional training and education in the business or engineering disciplines. Students graduating from academic programs in business and engineering are similar in their preparation to enter a profession with both discipline emphasizing respective technical specialties along with the essential



skills and knowledge. Hence academicians have the responsibility of contributing to the moral development of their students. Nevertheless, this pre-professional manager or engineer may not be sufficiently prepared to be a professional without a fully developed value system reflecting an appropriate sense of public welfare.

The need to address the development of ethical values is thus widely accepted across professions. As mentioned earlier, given the significant number of ethics violation that involve professional in business careers, a question exists as to whether the individuals who pursue careers in other professions such as engineers also have a less developed ethical values.

In recognizing the need for ethics in education, many business and engineering programs in the West as well as in Malaysia have either added ethics to their curricula or integrate this topic in other subjects. The current coverage of ethics depended upon the initiative of individual academicians.

## **1.2 Problem Statement**

There is an increasing realization in the international arena that there should be sharing of common concerns based on recognizing and responding to ethical dilemmas. Whether an individual acts ethically or unethically is a result of a complex interaction between individual's stage of moral development and several moderating variables including individual characteristics, organization's as well as the intensity of the ethical issues. Given that there is little empirical research on ethics in this area, international managers

have had in most cases draw their own conclusions regarding ethics in a foreign country. Therefore a reference point is required to help managers understand the ethical climate prevalent in Asia specifically Malaysia. As the university students will form the future managers and professionals, it is imperative to improve the current ethics courses offered so that they are able to respond to global challenges. Moreover, in line with the National Education Philosophy, which is the basis of the national education system, a high ethical awareness is essential to building competent, excellent and morally remarkable professionals. Higher Education Institutions (HEI) thus have a pivotal role in linking their curriculum with the existing education system and the approach embraced has to fulfill the nation's aspirations. In other words, teaching students of proper attitudes, values and integrity is an important function of higher education (Bligh et al., 2000). In addition, educators need to take an active role in building and nurturing an ethical culture among students. The foregoing raises several questions:

- (i) Whether students in Malaysian public universities have sufficient ethical knowledge and to what extent will they use this knowledge in academic as well as non-academic situations?
- (ii) Whether the content and delivery of ethics courses is adequate enough to equip these students in handling situations which require them to make critical decisions involving ethics in their professional as well as personal lives. These decisions inevitably have wide reaching impact on societies.

### **1.3 Research Objective**

The research has the following objectives :

- i) To determine ethical knowledge prevalent among students in Malaysian Public universities (IPTA).
- ii) To establish their propensity to use ethical knowledge for problem-solving activities and their level of ethics.
- iii) To analyze the content and delivery of courses in ethics in IPTA.
- iv) To develop module of ethics courses recommended to the Ministry of Higher Education.

### **1.4 Scope of Study**

This study encompasses all public universities (IPTAs) in Malaysia namely Universiti Teknologi Malaysia (UTM), Universiti Islam Antarabangsa (UIA), Universiti Sains Malaysia (USM), Universiti Teknologi MARA (UiTM), Universiti Malaysia Sarawak (UNIMAS), Universiti Malaysia Sabah (UMS), Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia (UKM) and Universiti Malaya (UM). This precludes all college universities (such as KUTKM, KUiTHO, KUSTEM etc) in Malaysia. It was confined to final year engineering students majoring in mechanical, civil, electrical, chemical, manufacturing and aeronautical.

## 1.5 Organisation Plan

This study is organised into 5 chapters. A uniform format for the presentation of each chapter is adopted. The main issues discussed in the five chapters are as follows:

Chapter I introduces the need for the study, the statement of the problem, objective of the research, scope of study and organizational plan.

Chapter II consists of the literature review that discusses on major topics namely ethical reasoning and cognitive moral development, ethical awareness as well as propensity to use ethical knowledge and specifically related topics in education and ethics course effectiveness.

Chapter III outlines the research methodology employed in the study. This includes the research instrument, its validity and reliability, sampling procedure and data collection technique as well as the analysis of data in the study.

Chapter IV presents the result on the findings. Using both descriptive and inferential statistics, it describes the characteristics of respondents and determines the ethical knowledge prevalent among respondents. It also analyses the propensity of respondents to use ethical knowledge for problem solving activities as well as their prevalent level of ethics. Finally, this chapter analyses the respondents' perception on the content and delivery of ethics courses and their effectiveness.

Chapter V considers the interpretation of the survey results. These results will be compared to some of the other related research. It will also discuss the contributions of the study and present recommendation in terms of the ethics module to be used in IPTA. Finally, the limitations of the study and suggestions for further research will be recommended.

**CHAPTER 2**  
**LITERATURE**  
**REVIEW**

## **2.1 Introduction**

The objective of this chapter is to provide a background and supporting materials for the study design and direction. The discussion of these materials have been divided into three major topics, ethical reasoning and cognitive moral development, ethical awareness and propensity to use ethical knowledge, and literature specifically related to ethics in education and ethics course effectiveness.

## **2.2 Ethical reasoning and Cognitive Moral Development**

Issues relating to moral or ethics are important to our lives. Norms upheld by society can be based on several factors such as fairness and ethical values as well as favouritism and disrespect towards certain group (Gardiner, 2004). In pre-industrial society, business activity, politics and religion were seen as part of the community and integral to their social life. Hence, the ethics of society was considered as ethics of economical activity. The emergence of industrial era, however, changed this set-up. In this era, the individual's role in politics, religion and family could be distinguished distinctly from his or her role in the economy (Shepard et al., 2004).

The development of major professions such as medicine, law, engineering and accounting has followed a similar development. These major professions have formed professional associations, established educational standards and curricula requirement, and adopted codes of ethics. However, the early code of ethics were restricted only to responsibilities as a professional and only after World War II, codes of ethics were revised to reflect concern for public welfare (O'Clock and Okleshen, 1993).

### 2.2.1. Kohlberg's Cognitive Moral Development Theory

In the quest of understanding individual's behaviour, researchers have investigated various personal characteristics and traits and as a result, several typologies have emerged. One of them is the cognitive moral development typology, which focus on the individual reasoning in moral dilemma and decision-making (White, 2002). Among the prominence scholars in the field of moral development typology are Immanuel Kant, Lev Vygotsky, John Dewey, Jean Piaget and Lawrence Kohlberg (Bateman, 1998). However, Kohlberg's cognitive moral development typology, which originally called "the cognitive-development theory of moralization (Reimer et al., 1983), is the most highly regarded and being referred to by many scholars (Bateman, 1998). Kohlberg's typology has four major components : cognitive component which influence moral judgement, the modes of thinking which is hierarchical in nature, individual's moral development through sequence of stages and finally, as individuals move to higher stages, they tend to solve their problems at the highest stage of development (Cole, 2003).

The first component reflects on an individual cognitive development, as the way of thinking will be developed as individual grow. Kohlberg states that individuals make different judgement and outcome in a particular ethical dilemma based on their placement in different stages of moral development (Bateman, 1998). Bae (1999) sighted that Kohlberg's stages can occur at varying times between individuals, which means that the advancement rate or ages may differ for individuals at a same stage. Loescher (2003) also hinted on the possibility of individual that may be stagnant at a lower stage or unable

to develop to the higher stage. The second, third and fourth components of Kohlberg's typology are related to the development stages. As Kohlberg typology is based on stages, the moral development must move sequentially without skipping any stage. For example, individual in the stage one of moral development cannot jump to stage three. In other words, an individual must go through the second stage before he or she can move to the third stage and so on.

Kohlberg's typology outlines three levels of moral development : pre-conventional, conventional and post-conventional level. Each level is subdivided into two stages, making up six stages of moral development. Level one or the pre-conventional level is exclusively self-centred where egocentric and immature individuals see the value of human life only as a means to their own needs (White, 2002). At the conventional level, individuals value their presence in society, thus the influence of society is considered in moral reasoning. The third level or the post-conventional level stressed on moral principles and universal principles of justice. The following table (table 2.0 ) shows the level and stages of Kohlberg's stages of moral development (adapted from Reimer et. Al, 1983, pg 58-61):

According to Kohlberg, individual at level one do not really understand the conventions or rules of society, but they are responsive to cultural rules and labels such as good, bad, right or wrong. The interpretation on the labels, however, is based on physical avoidance of pain or preferable outcome of personal gain (Lovell, 1995). The underlying argument of physical avoidance is evidenced in Kohlberg's stage one of moral development.



In this stage, individual perceive that good behaviour is associated with avoiding punishment, without tolerating the consequences of the actions. Thus, for example, a student will not cheat in examination for fear of being caught and being terminated from the college. Such action may affect their job performance in future if not considered in their moral judgement. Bae (1999) suggests that individual of this stage are similar to those toddlers with age between one to three years.

In the second stage, right action are perceived as those that satisfy individual's needs. Human relations are perceived as those where the elements of fairness, reciprocity and equal sharing are present, but they are always interpreted in a pragmatic way. Reciprocity is being described by a notion of 'you scratch my back and I will scratch yours'; elements of justice, loyalty and gratitude are not present. Action is considered right if it can fulfil an individual's needs or if it can provide fair outcome for those involved.

**Table 2.0**  
**Kohlberg's stages of moral development**

Level and Stage	Content of Stage		
	What is Right	Reasons for Doing Right	Social Perspective
<p>Level 1 - Pre-conventional</p> <p>Stage one – the punishment and obedience orientation</p>	<p>Sticking to rules backed by punishment; obedience for its own sake; avoiding physical damage to persons and property.</p>	<p>Avoidance to punishment, superior power of authorities.</p>	<p><i>Egocentric point of view.</i> Doesn't consider the interests of others or recognize that they differ from the actor's; doesn't relate two points of view. Actions considered physically rather than in terms of psychological interests of others. Confusion of authority's perspective with one's own.</p>
<p>Stage two – the instrumentalist relativist orientation</p>	<p>Following rules only when in one's immediate interest; acting to meet one's own interests and needs and letting others do the same. Right is also what is fair or what is an equal exchange, deal or agreement.</p>	<p>To serve one's own needs or interests in a world where one has to recognize that other people also have interests.</p>	<p><i>Concrete individualistic perspective.</i> Aware that everybody has interests to pursue and that these can conflict; right is relative (in the concrete individualistic sense).</p>
Level and Stage	Content of Stage		
	What is Right	Reasons for Doing Right	Social Perspective

<p>Level 2 - Conventional</p> <p>Stage three – the good boy/nice girl orientation</p>	<p>Living up to what is expected by people close to you or what people generally expect of a good son, brother, friend, etc. “Being good is important and means having good motives, showing concern for others. It also means keeping mutual relationships such as trust, loyalty, respect and gratitude.</p>	<p>The need to be a good person in your own eyes and those of others; caring for others; belief in the Golden Rule; desire to maintain rules and authority that support stereotypical good behaviour.</p>	<p><i>Perspective in the individual in relationships with other individuals.</i> Aware of shared feelings, agreements, and expectations that take primacy over individual interests. Relates points of view through the concrete Golden Rule, putting oneself in the other guy’s shoes. Does not yet consider generalized system perspective.</p>
<p>Stage four – the law and order orientation</p>	<p>Fulfilling duties to which you have agreed; laws to be upheld except in the extreme cases where they conflict with other fixed social duties. Right is also contributing to the society, group or institution.</p>	<p>To keep the institution going as a whole and avoid breakdown in the system “if everyone did it”; imperative of conscience to meet one’s defined obligations.</p>	<p><i>Differentiates societal point of view from interpersonal agreement or motives.</i> Takes the point of view of the system that defines roles and rules; considers individual relations in terms of place in the system.</p>
<p>Level and Stage</p>	<p>Content of Stage</p>		
	<p>What is Right</p>	<p>Reasons for Doing Right</p>	<p>Social Perspective</p>

<p>Level 2 – Post-Conventional Stage five – the social contract orientation</p>	<p>Being aware that people hold a variety of values and opinions and that most of their values and rules are relative to their group. Relative rules usually upheld in the interest of impartiality and because they are the social contract. Some non-relative values and rights (eg. life and liberty) must be upheld in any society and regardless of majority opinion.</p>	<p>A sense of obligation to law because of one’s social contract to make and abide by laws for the welfare of all and for the protection of all people’s rights. A feeling of contractual commitment freely entered upon, to family, friendship, trust and work obligations. Concern that laws and duties be based on rational calculation of overall utility, “ the greatest good for the greatest number”.</p>	<p><i>Prior-to-society perspective.</i> Rational individual aware of the values and rights prior to social attachments and contracts. Integrates perspectives by formal mechanisms of agreement, contract, objective impartiality, and due process. Considers moral and legal points of view; recognizes that they sometimes conflict and finds it difficult to integrate them.</p>
	Content of Stage		
	What is Right	Reasons for Doing Right	Social Perspective

<p>Stage six – the universal ethical principal orientation</p>	<p>Following self-chosen ethical principles. Particular laws or social agreements usually valid because they rest on such principles; when laws violate these principles, one acts in accordance with principle. Principles are universal principles of justice: equality of human rights and respect for the dignity of human beings as individuals.</p>	<p>The belief as a rational person in the validity of universal moral principles and a sense of personal commitment to them.</p>	<p>Perspective of a moral point of view from which social arrangements derive. Perspective is that of a rational individual recognizing the nature of morality or the fact that persons are ends in themselves and must be treated as such.</p>
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Source : Reiner et.al, 1983 p.5

There is a growing ability to view things from other perspective, but still the moral judgement is centred on one self. An illustration for the moral reasoning in this stage is as follows : A student may agree to sign on behalf of his or her friend in the lecture attendance sheet provided. If the student does not agree, his friend will not want to help him to cheat in the examination. The child in preschool (age between three to six years old) should have developed their moral reasoning ability at this stage (Bae, 1999).

The third stage of Kohlberg's stages of moral development perceived that individual would behave to please others and to get approval from them. It is a "good boy" or "nice girl" notion that are expected by individual as the approval from others for their behaviour. Thus, when the individual is faced with ethical dilemma, individual at this stage will look at the possible solution that will satisfy the "good boy" or "nice girl" notions, which often involves self-sacrifice. For example, in the Heinz<sup>1</sup> dilemma posed by Kohlberg, should Heinz steal the drug to save his wife? The respond of the third stage might be "Heinz should steal the drug although he would probably be caught and sentence to jail. However, his in-laws will think that he is a good husband. Another example is from the legendary Robin Hood where he stole from the wealthy people and distributed the stolen goods to the needy. In the eyes of the needy, Robin Hood is a hero or the "good boy". According to Bae (1999), child between six to twelve years have the ability to develop their moral reasoning at this stage.

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<sup>1</sup> Kohlberg used Heinz dilemma on his respondents to investigate their moral reasoning on specific course of action.

The maintenance of rules and social order assume importance over other considerations explains the fourth stage (Lovell, 1997). The individual concern is now on a larger society rather than loyalty to a particular people or groups. For example, in the Heinz dilemma scenario, the judge involved in Heinz case should sentence him to jail because any exceptions will lead others or the society to think that it is right to steal if you are in a desperate situation (in Heinz case, he wants to save his wife). Individual age twelve and above may have the moral reasoning ability for this stage onwards (Bae, 1999).

The fifth stage is generally defined based on utilitarian overtones. It provides some flexibility to change certain laws in view of rational considerations of social utility or public interest, which is in contrast with the stage four for its rigidity in maintaining law and order. The law should be set up (and may be reviewed) by social contract to provide greater benefit for the society. For example, a possible response to the Heinz dilemma at this stage is that Heinz should steal (although stealing is against the law) the drug because his wife has the right to live. If Heinz was caught and brought to justice, there should be some reinterpretation of the law because a person's life is at stake.

Reciprocity, equality of human rights, universal principles of justice and human dignity are among the core ingredients in the final or sixth stage of Kohlberg's stage of moral development. Normally, laws are socially determined and should be just. However, in certain cases, laws can be broken if inequities exist or when violation of justice exists (Lovell, 1997). For example, the possible response to Heinz dilemma at this stage: Heinz

should steal the drug to save his wife because preserving human life is a higher moral obligation than preserving property.

Kohlberg's model, however, is not free from criticism and limitations. Critics of Kohlberg's level of ethics argue that his method of studying moral judgements has certain limitations. It was pointed out that his system uses abstract principles of justice as the basis of advanced moral reasoning where this penalizes those who focus on the interpersonal implication of a moral decision. It was argued that Kohlberg's representation of women as fixated at Stage 3, which represents interpersonal morality is flawed (Gump et,al, 2000). Gump et al offered alternatives such as the Moral Justification Scale, which they tested was found to be more useful in distinguishing between those who are care-oriented from those who are justice-oriented in moral reasoning. Meanwhile some argue that the Kohlberg model does not represent how people make actual decisions when faced with real-life ethical dilemmas of their own though they typically hold one set of beliefs and values (Alston, 1971).

Evidence of a strong link between level of moral judgement and moral conduct was also not provided by Kohlberg and his measures of moral reasoning appear to predict incorrectly the moral behaviour of the subjects at the lower stages of moral maturity (White, 2001).



### 2.3 Propensity to Use Ethical Knowledge

Dynamic consistency is the term that explains a person's tendency to uphold a particular moral standard and to behave accordingly, and the failure to do so will make that person feel guilty (Hoffman, 1963). The idea of dynamic consistency has been consistently supported by the cognitive moral development scholars such as Kohlberg and Piaget. The proponents suggest that there is a congruity between a person's moral judgements, attitudes and actions (White, 2002). However, dynamic consistency seems to be idealistic because if the idea is true, then it is easy to predict individual behaviour or action. Individual beliefs may differ from their intention and actual behavior (Weber and Gillespie, 1998), although other studies suggested otherwise (eg. Fishbein and Ajzen., 1975). Those studies, which were based on the Theory of Planned Behavior, (Ajzen, 1985) were evidenced of the attempt made by the social scientist to explain the gap between beliefs, intention and actual behaviours. White (2002) further argued that there are numerous internal and external factors that may influence individual ethical behaviour. In addition, there was also a study which attempted to explain the relationship between religiosity, ethical ideology and intended behaviour of individual (Barnett et al., 1996). One similarity of the literatures mentioned above is that the researcher recognized that there are several factors that may affect the intention and actual behaviour of a person.

Some literatures have also stressed on the effect of personal values on ethical consideration (Huss and Patterson, 1993 and Amer, 2000). Amer (2000) argued that

individual are becoming influenced by their own values in determining one's behaviour and action, which means that they are setting their own standards of ethics. Beekun (1996) also realized the effect of personal values and personality as one of the factors that influence the ethic of an individual. Thus, providing ethical knowledge alone would not guarantee that a person to be ethical because there are many factors that can influence one's behaviour. A research on the ethical perceptions and the ethical action propensities by Geiger and O'Connell (1997) suggests that students' propensity to apply their ethical knowledge may vary under different set of situations. Their findings supported earlier studies by Tyson (1992) and McCuddy and Peery (1996) on propensity and were some of the examples that disapproved the theory of dynamic consistency.

## 2.4 Factors Influencing Ethics and Moral Reasoning and Development

The study on ethics and moral reasoning and development has attracted the interests of a large number of scholars in this field. One of the issues that has been discussed and investigated is related to the factors that might influence them. The following table 2.1 illustrated some of the findings from previous researches.

**Table 2.1**  
**Summary of previous studies related to ethics**

Factors	Authors
<ul style="list-style-type: none"> <li>- Gender, academic major (business vs non-business) and religious commitment influenced the ethical judgements.</li> <li>- Gender highest impact compare to other factors.</li> <li>- Female students more critical (less tolerant) on ethical issues.</li> </ul>	Knots, T.L. et al. (2000)
<ul style="list-style-type: none"> <li>- Age, education (no. of years of formal education) and race did not have significant effect on moral development.</li> </ul>	White Jr, R.D. (1999)

<ul style="list-style-type: none"> <li>- Female score significantly higher on the DIT - Gender affect moral development</li> </ul>	
<ul style="list-style-type: none"> <li>- The level of moral reasoning of younger, less experienced manager is higher than the older.</li> <li>- Age is negatively related to moral reasoning.</li> </ul>	Elm, D.R, and Nichols, M.L. (1993)
<ul style="list-style-type: none"> <li>- No significant difference between sex and DITP scores and no significant difference between gender and DITP scores.</li> <li>- Sex and gender have no effect on cognitive moral development.</li> <li>- Significant effect of education on DITP scores.</li> </ul>	Kracher, B. et al. (2002)
<ul style="list-style-type: none"> <li>- Gender does not affect moral reasoning (ethics).</li> <li>- Significant difference between age and moral reasoning and education and moral reasoning.</li> <li>- Religious affiliation and religious commitment affect moral reasoning.</li> </ul>	Wimalasiri, J.S. (2001)
<ul style="list-style-type: none"> <li>- Men and women differ in the levels of moral reasoning : women’s moral reasoning is significantly higher than the man.</li> <li>- Academic major (business vs non-business) do not influence moral reasoning.</li> <li>- Level of education (graduate vs undergraduate) influence moral reasoning. Graduate students have higher level of reasoning than that of undergraduate.</li> <li>- Significant relationship between schools (universities) attended and moral reasoning.</li> </ul>	Elm, D.R et al. (2001)

- Women were more likely to make ethical choices than men	Glover et al. (2002)
- Personal values did not influence auditors perceptions of the moral intensity of the ethical dilemmas	Shafer et al. (2001)
- Religious beliefs may be an important influences on individuals' levels of ethnicity	Terpstra et.al (1993)
- Both individual characteristics and environmental and organizational factors have been recognised as influencing ethical behaviour	Trevino (1986)

## 2.5 Ethics in Education

The success of the Malaysian economy can be attributed by its ability in managing its k-economy. In this context, the most critical element that would give great impact. Lisman (2000) affirmed that the education system not only prepare students to be competent workers, but also to be competent 'citizen' which refers to the capability of individual to be ethical. The employers also seek a workforce that is not only educated, but also ethical.

The theoretical concept of ethics needs to be developed beyond the minimum legal standard. Due to this reason, ethical education is vital (Clark, 2003 ; Trevino and Nelson, 2004, Crane and Matten, 2004). Business ethics is primarily concerned with issues not only covered by the law, or when there is no well-defined consensus on whether something is right or wrong (Crane and Matten, 2004). According to Clark (2003), it serves as guidelines in decision-making process and also in manging business problem.

In relation to this, the code of ethic is necessary to provide guidance and encourage public confidence.

Zandvoort et al (2000) assert that engineering ethics is defined as being concerned exclusively with the actions and decisions made by persons, individually or collectively, which belong to the profession of engineering. Every profession has their own code of ethics. These codes express the rights, duties, and obligations of the members of the profession. Different profession has different code of ethics. For example, the code of ethic for a lawyer is totally different from the code of ethic of an engineer. Brown (1997) asserted that such code of conduct also have a powerful influence over the members of a profession, since they provide a mechanism by which the profession can control its membership. These codes will add trust and provide members of organization to higher status, and provides a framework for ethical judgment of a profession. No code can be totally comprehensive and cover all possible ethical situations. A key concept in engineering ethics is the notion of ‘professional responsibility’, which many ethicists characterize as a type of moral responsibility arising from special knowledge possessed by an individual (Herkert, 2000). Hence, teaching ethics is an essential part throughout the entire curriculum (Fleischmann, 2003).

### **2.5.1 Objective of ethics in education**

A review of literature indicates that the ultimate goal of education in ethics is to promote and sustain human value, to develop a broad view of the profession, and to develop moral sensibility. They are as follows :

(a) *To promote and sustain human value*

According to McPhail (2001), education in ethics must be able realize the student to appreciate the impact of their routine practices (as an engineer) on other people or on society in general. Furthermore, it is not just imparting student with the rules but rather the process of preparing them to become more conscious and sensitive when involved in ethical choices or dilemma that construct their identities. It also encourage student to develop a critical awareness of their own values and contradictory values (Kuhn, 1998). Weisberg and Duffin (1995, p. 248) sum up that the ethics education is “ to make professional ethics, professional culture and professional education the object of study rather than simply the unreflective consequences of exposure to professional language, culture and training.”

(b) *To develop broad view of the profession.*

It is a necessity to provide and develop a broad view of the profession and not limited or too focused on a narrow scope or work. The students who will be future engineers must be aware of critical ethical issues that relate to and across other field. This includes the view from different perspective and context such as from social, economic, market and political dimensions (McPhail, 2001; Mahoney, 1990). Thus it will allow the broader or holistic approach of ethical issues, the evaluation process, problem solving as well as solutions related to these ethical issues.

(c) *To develop moral sensibility*

According to Kuhn (1998) course in ethic should develop students' moral sense rather than their analytical reasoning skills. Wichman and Foa (1996) contend that education in ethic requires sensitivity. From the literature in medical and legal, the development of moral sensitivity has been related to the rehumanisation of the professions, personal and professional values (McPhail, 1999; Kuhn, 1988).

In the process of educating and producing good students, it is imperative to examine the nature of ethics in the curriculum and its justification. Other ethical-related issues raised must also be define such as; is it properly structured in the education curriculum? What are the core ethical values that must be taught? How to deliver the ethic course? Can the teaching techniques assure that it will instil good values to students who will be future workforces? To what extent can it prevent unethical practice in the reality of life? Therefore all the aforementioned issues needs to be identified and resolved to tackle the bigger challenges confront today and in future.

### **2.5.2 Domain of ethics curriculum.**

The domain of ethics curriculum needs to be examined from four different approaches namely regional approaches, corporate scandals, globalisation impact, and institutional shifts.

(a) *Regional approaches*

The development of curriculum in ethics needs to consider the area or region where the subject is being taught (Crane and Matten, 2004. ; Lisman, 2000). This is because the difference in cultural aspects had brought into effect different perspective on ethic-related issues and its approaches. Studies have shown that there are differences between the European and US approaches in dealing with ethical issues and problem as shown in the table 2.2 (Crane and Matten, 2004; van Luijk, 1990; Vogel, 1998 ; Enderle, 1996).

**Table 2.2**  
**Different approaches in dealing with ethical issues & problems**

<b>Issues</b>	<b>United States</b>	<b>Europe</b>
Who is responsible for ethical conduct in business?	The individual	Social control by the collective
Who is the key actor in business ethics?	The corporation	Government, trade union, corporate association
What are the key guidelines for ethical behaviour?	Corporate codes of ethics	Negotiated legal framework of business
What are the key issues in business ethics?	Misconduct and immorality in single decision situations	Social issues in organizing the framework of business
What is the dominant stakeholder management approach?	Focus on shareholder value	Multiple stakeholder approach.

Source: Crane and Matten, 2004

(b) *Corporate Scandals*

The development of curriculum must take into consideration the issue of corporate scandal that could be discussed and incorporated into the syllabus. By illustrating and discussing cases, it will help student to visualize and understand the ethical nature in a broader context and finally learn some lessons (Crane and Matten, 2004,; Kidd and Richter, 2002).



*(c) Impact of Globalisation*

Globalisation has changed the way of doing business and the role and relevance of national and transnational regulation of business activity (Crane and Matten, 2004). The codes of practice on a variety of ethical issues have undergone changes at all level – company, industry, national and international (Van Tulder and Kolk, 2001,; King and Lenox, 2000; McIntosh et al., 2003). The student must be exposed to this new development to enhance the level of awareness on the current code of practice.

*(d) Institutional shifts*

The role and power of the institutional of business, government and society have changed. Many ethical decisions in business have become significantly influenced by societies action such as protest and boycott. This implies that ethical issues are no longer determined by government, but also by business as well as society (Bendel, 2000).

## **2.6 Delivery of Ethics course**

Several methods deemed useful have been employed to teach ethics. They are as follows: case studies, forums, emotional sensitivity, games, mission and values statement, and volunteer community service projects.

(a) *Case studies*

According to Fleddermann (2000), in teaching ethics for engineering students, it can be valuable to employ case studies that involved technical issues that have already been studied in other courses. The technical issues discussed must be relevant to the student and particularly focused on their field of study. These cases can be developed in-depth technically to promote interest, so that meaningful discussions can take place. For each of the case study, a brief description or background of the case or organization under study is presented, a few of the ethical concept is illustrated and sources of information are listed to make it more valuable and realistic.

In addition, the students are required to write a report discussing the ethical issues in the case study, how it was presented, and make comment on the solution given by the author. The interesting part is they are encouraged to discuss the case study with the engineers at their workplace.

(b) *Forums*

Lisman (2000) said one approach that is still under utilized in promoting ethics is to provide forums involving community meeting together and discussing their concern about a variety of topics. It will expose the student on community expectations, concerns and hopes. The education institution also can play a role not only as a conveyor of such forum but also can help citizen.

(c) *Emotional Sensitivity*

According to Clark (2003), one methodology that could be used to teach business ethics is to encourage empathy with others. The professionals need not look only at the numbers and figures but must also have sense of moral sensitivity for others. But the problem with this approach is that it is very difficult to quantify and measure its objectives and their learning outcomes.

(d) *Games*

At the Electrical Engineering Faculty, California State University have developed the board games (known as Ethics Challenge) based on the cartoon character 'Dibert'. The result of the experiment demonstrated that student were very enthusiastic and have fun while involved in group discussion and decision-making. Each student had a chance to express verbally his or her group's opinion. Other findings were that 80% of the student realized the important of ethics before they were engaged in the Ethic Challenge. About 50% of the students mentioned that it changes the way they think about ethics personally and professionally.

(e) *Mission and values Statement*

This approach has been implemented at Padnos School of Engineering (PSE) in early 1990's. The mission and value statement focus on individual value in community and also the environment value. For many years, according to Fleischmann (2003), this statement served to guide faculty thinking.

In addition to mission and values statement, at PSE, they also practiced Honor Code. The Honor Code is a declaration or statement of agreement on the Honor concept within the context of professional practice. It is printed on a 2 sides card. The students are asked to read both sides of the card and are required to understand it. Signing a statement of agreement also help to increase their perception that they are about to enter a profession with high standard of conduct (Fleischmann, 2003).

*(f) Volunteer Community Service Projects*

This project was initiated to promote ethics and social responsibility among engineering students. It provided opportunity to exercise responsibility to enhance ‘human welfare’ as required by professional codes of ethics (Fleischmann, 2003).

## **2.7 Ethical knowledge for Engineers**

With ethical knowledge, the engineer will have more concern over the safety, health and welfare of the public. Loui (1999) assert that in real life, solving ethical problems requires collaboration between different kinds of professional, which leads to the cooperation of diverse experiences and values. This would in turn assist in a better and more informed decisions. The engineers will consider the safety of the publics first before he or she make any decision or implement a design as the product may endanger the publics (Loui, 1999). A useful teaching method for achieving integration of engineering ethics and engineering’s societal context is to broaden the discussions of engineering ethics by including the ethical implications of public policy issues relating to engineering or the development of technology (Herkert, 2000). Other scholar such as Ino (2001) also

claimed that the establishment of self-discussion on values are the two most vital requirements in autonomy of judgement in engineering ethics. With this knowledge, the engineers will make a lot of considerations before taking any action or making any important decision.

Besides, with the ethical knowledge, engineers will act for each employer or client as trustworthy agents. Some engineers accept payment from more than one party for services on the same project. This type of engineers lack ethical knowledge. With this knowledge, they ought to be very clear about their role in a company and act as a faithful employee (Iino, 2001). Besides management skills, the trustworthiness of an engineer is another main consideration before appointing him or her to become a manager.

# **CHAPTER 3**

## **RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter outlines the methodology employed in the study. The study was carried out using the survey approach, which is the most widely used formal research design. According to Tull and Hawkins (1990), survey research is “a systematic gathering of information from respondents for the purpose of understanding and/or predicting some aspect of behaviour of the population of interest”(p.138). Similarly Aaker and Day (1986) define survey research as “a structured collection of data directly from representative samples of respondents”(p.55). Whatever data collection method employed, the researcher must be concerned with sampling, questionnaire design, questionnaire administration and data analysis in a survey research process (Alreck and Settle, 1985). This section thus provides a description of the design of the research instrument, its reliability and validity, the sampling procedure as well as the data collection procedure.

### **3.2 Research Instrument**

The survey instrument was a 7-pages questionnaire. The questions relevant to this study were found in five sections. In section A, demographic questions were asked. This part contain eight questions covering gender, race, religion, degree programme, name of institution, type of secondary school attended during Form 4 and 5, place of residence when in secondary school and the latest CGPA.

In section B, the respondents were tested on their ethical knowledge. They were required to tick “Yes” or “No” for the appropriate answer. These questions were mostly related to

general ethical knowledge while the rest were associated with the engineering profession. All the ten questions were obtained from experienced academicians who have taught this subject for more than ten years.

The Vignette method was utilized to elicit respondent's propensity of ethical consideration in decision-making. According to Alexander and Becker (1978, p.94) :

“Vignettes are short descriptions of a person or a social situation which contain precise references to what are thought to be the most important factors in the decision-making or judgment-making processes of respondents”

Therefore in section C, the respondents were given four scenarios. Inputs for the first two scenarios were drawn from Geiger and O'Connell (1997) study and the last two scenarios were derived from websites (available from <http://www.onlineethics.org/cases/pritchard.inside.html> and <http://www.onlineethics.com/cases/nspe/ec93-1.html>). All of these scenarios were slightly reworded accordingly to fit the needs of the present study as well as to suit the Malaysian environment without changing the basic premise of each scenario. They were then followed by three questions to gauge their ethical knowledge propensity. The response from the first question (where respondents were asked as to what extent they believed the individual's action was unethical or ethical) were measured on a seven-point category scale ranging from “1 = ethical” to “7 = unethical”. The response from the second questions (where respondents were asked as to what extent they believed of the likelihood that they would perform the same action) were measured on a seven-point category scale ranging from “1 = low” to “7 = high”.



The response from the third questions (where respondents were asked on their perception as to whether their peers would have performed the same action) were measured on a seven point category scale ranging from “1 = low” to “7 = high”.

In section D, a scenario obtained from website <http://www.vtaide.com/png/Kohlberg.htm> were given to respondents. They were then requested to either tick answer 1, 2 (derived from website <http://www.vtaide.com/png/kohl1.htm>) or 3, 4 (drawn from website <http://www.vtaide.com/png/kohl2.htm>) or 5,6 (obtained from website <http://www.vtaide.com/png/kohl3.htm>). Ticking only one answer will indicate the possible stage responses as suggested by Lawrence Kohlberg. Certain inference can then be deduced based on these responses. The Defining Issues Test (DIT), a test of ethical development based on Kohlberg six stages was quite complicated and lengthy. One of the limitations of the DIT is that the ethical dilemmas set out in the test instrument are not situations found in a business or engineering environment. Therefore it was not incorporated in this section. Furthermore, for scoring purposes, it is time consuming since the survey responses needs to be forwarded to the scoring service at the Centre for the Study of Ethical Development in USA.

In section E, the respondents were asked on the delivery, content and their assessment towards the ethic courses that they have attended. This section aims to evaluate the effectiveness of the ethic courses. All of the questions were selected based on discussions with academicians who have the experience and are knowledgeable in this topic.

The completed questionnaire was subjected to a pre-test using 30 respondents. All of these respondents were final year engineering students. Based on the feedback obtained from these respondents, the final version of the questionnaire was developed (refer to appendix A1).

### **3.3 Validity and Reliability**

Validity refers to the extent to which a test measures what we actually wish to measure (Cooper and Schindler, 2001). According to Sekaran (2000), validity ensures the ability of a scale to measure the intended concept. Two types of validity, content and face validity was considered. Content validity was established using professional literature to guide survey development and through a review by several experienced academicians with a background in ethics education research. Face validity was decided during the pilot testing. Those participating in the pilot tests were requested to consider the face validity of the instrument, confirming that the questions appeared to draw out the desired information.

Reliability deals with the consistency of responses to questions in the questionnaire. There are three common approaches in assessing reliability as outlined by Mitchell (1996) namely test-retest; internal consistency and alternative form. According to Saunders, Lewis and Thornhill (2000), the test-retest approach are obtained by corresponding data with those from the same questionnaire collected under as near equivalent conditions as possible. The questionnaire therefore, needs to be administered

twice to respondents. This may result in difficulties, as it is often difficult to convince respondents to answer the same question twice. Other complexities can also occur in this approach, which can cause a downward bias in stability.

In this study, the test-retest approach was employed. Respondents were not informed that they need to answer the same question twice but notified that they will be given a non-monetary incentive (which is a 'ruler-calculator') to encourage them to partake twice in this approach. They were also allowed to use pseudonym of various names. At the same time, in order to overcome a downward bias in stability, the interval between test and retest was extended to three weeks as suggested by Cooper and Schindler (2001). The Wilcoxon signed-ranked test (also referred to as the Wilcoxon T-test) was performed on three sections of the instruments. For section related to ethical knowledge, the results as shown in appendix 1(a) indicated no significant differences between initial score and repeated score which is  $p=0.203$  ( $p>0.5$ ). For the other 4 Vignettes in section C on respondents 'believe whether an individual's/groups action was ethical/unethical', 'likelihood of performing the same action' and 'perception on whether peers/colleagues performed the same action', as illustrated in appendix 1(b), performing the same test demonstrated no significant differences between initial and repeated score ( $p>0.5$ ). In section D on respondents possible Kohlberg stage responses, as indicated in appendix 1(c), performing the same test also displayed no significant differences between initial and repeated score that is  $p=0.683$  ( $p>0.05$ ). All the above results thus indicated a reliable (stable) measures used in the study.

In addition, several steps suggested in survey research were also taken to improve the reliability of the survey instrument as suggested by Fowler (1984). First, all respondents were requested to answer the same questions. This helps to ensure consistent measurement. Therefore, differences among respondents are assumed to be differences among respondents instead of differences in survey questions. Second, the wording of the questions was closely considered during pilot testing. To ensure that the meaning of each question is unambiguous, each question was reviewed for complex or incomplete wording.

### **3.4 Sampling procedure and Data Collection technique**

In accordance to the objectives of this study, it was confined to final year engineering students pursuing in all IPTAs in Malaysia, namely Universiti Teknologi Malaysia (UTM), Universiti Islam Antarabangsa (UIA), Universiti Sains Malaysia (USM), Universiti Teknologi MARA (UiTM), Universiti Malaysia Sarawak (UNIMAS), Universiti Malaysia Sabah (UMS), Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia (UKM) and Universiti Malaya (UM). In terms of data collection technique, the study utilized the questionnaire survey approach. Prior to that, a letter requesting access and cooperation in conducting the survey was sent to the Registrar and Dean of all the faculties involved (Appendix A2). Anonymity and non-monetary incentives were two techniques used to raise questionnaire rates as suggested by Jobber and O'Reilly (1996). Therefore, it was decided to offer a calculator ruler as non-monetary incentives to respondents in order to secure a 100% response rate in terms of completely filling in all sections. This is because the questionnaires were written in

English and not translated to Bahasa Malaysia (which is the standard medium of instruction for all subjects taught in all IPTAs in Malaysia<sup>1</sup>). Furthermore, the questions were quite lengthy with scenarios available in two sections. A stratified random sampling technique was used and each IPTA was stratified according to the types of engineering degree courses offered. The categories were then collapsed under a common engineering degree such as mechanical, civil, electrical, chemical, manufacturing and aeronautical. According to Peterson's (1988) sampling rules of thumb, "always have a minimum sample size of 30" (p.351). Hence at each stratum, applying the stratified constant sampling concept, a minimum total of 30 respondents were targeted.

The researchers were stationed at each faculty and would approach the respondents while they were entering or exiting the faculty. The researchers would first introduce themselves and explain the purpose of the survey. If the respondents agreed to participate in the study, the questionnaire would be given to them. The researchers would collect the questionnaire from the respondents after the respondents had completed the questionnaire. They were given a non-monetary incentive (i.e. a calculator-ruler) after verifying that all sections of the questionnaires had been completely filled in.

### **3.5 Analysis of data in this study**

This survey covered a large variety of questions, only some of which are directly reported in the analysis; many others were only used as background information to support the analysis. A total of 760 students participated in the study but after screening for

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<sup>1</sup> Nevertheless, anecdotal evidence suggests some subjects especially in the final year used English as the medium of instruction. Final year student are also expected to be well verse in English (verbal and written) before they graduate.

incomplete questionnaires and eliminating majors other than those mentioned above, the responses of 745 students was analyzed. The analysis of data was carried out using SPSS for windows version 10.0. Data will be analysed using both descriptive and inferential statistics namely non-parametric tests due to the nature of the data and the fact that it violates the stringent assumption of a parametric test. Details of the data analysis will be reported in the next chapter.

# **CHAPTER 4**

## **SURVEY FINDINGS AND ANALYSIS**

## 4.1 Introduction

The purpose of this chapter is first to present the empirical findings of the survey. It begins with a description of the general characteristics of the respondents. This is followed by a discussion on specific objective of this study that is first, to determine ethical knowledge prevalent among students in Malaysian public universities; second, to determine the propensity to use ethical knowledge for problem-solving activities; third, to determine the level of ethics amongst the aforementioned students and finally, to analyze the content and delivery of ethics courses in these universities. Other relevant findings that have been investigated during the survey are also reported.

## 4.2 Characteristics of the Respondents

Based on the data collected, the demographic profile of respondents was constructed (Table 4.0). More than half of the respondents in the sample consisted of male (59.8%) with the majority of them in terms of ethnic group, were Malays (58.1%), followed by the Chinese (29.3%). A greater proportion of them were Islam (59.6%), followed by Buddhism (25%) and Christianity (11.3%).

In terms of institution, most of the respondents were from USM (18.1%), followed closely by UM (17.2%) and UTM (16.0%). A small proportions of these respondents were UIA (3.5%) and UMS (4.7%). The respondents come from a wide range of engineering courses with 25.1% from civil, and 25% and 23.5% from electrical and mechanical courses respectively.



**Table 4.0**  
**Sample Profile**

<b>Demographic Variable</b>	<b>Category</b>	<b>Frequency</b>	<b>Valid Percentage (%)</b>	
Gender	Male	445	59.8	
	Female	299	40.2	
Race	Malay	432	58.1	
	Chinese	218	29.3	
	Indian	50	6.7	
	Others	44	5.9	
Religion	Islam	442	59.6	
	Buddhism	185	25.0	
	Christianity	84	11.3	
	Hindu	26	3.5	
	Others	4	5	
Institution	UTM	119	16.0	
	UIA	26	3.5	
	USM	135	18.1	
	UiTM	60	8.1	
	UNIMAS	60	8.1	
	UMS	35	4.7	
	UPM	79	10.6	
	UKM	103	13.8	
	UM	128	17.2	
Degree	Mechanical	172	23.5	
	Civil	184	25.1	
	Electrical	183	25.0	
	Chemical	120	16.4	
	Manufacturing	20	2.7	
	Aeronautical	54	7.4	
Secondary school	MRSM	125	16.9	
	National Secondary School	424	57.3	
	Religious Secondary School	38	5.1	
	National Chinese Secondary School	64	8.6	
	Private Secondary School	11	1.5	
	Technical School	77	10.4	
	Others-SBP	1	1	
	Residence	With parents	411	55.2
		With guardian	12	1.6
Hostel		317	42.6	
Others		5	7	
CGPA (Mean = 2.96)				

Of the 745 respondents, as many as 57.3% attended National Secondary school followed by 16.9% in MRSM during their form four and five. A majority of them (55.2%) indicated that they stayed with their parents as their place of residence. This is closely followed with 42.6% of them showing that they stayed in the Hostel. The average CGPA of the respondents was 2.96.

### **4.3 Results of Data Analysis**

The data was analysed using both descriptive statistics (mean, percentages) and inferential statistics (non parametric test such as Kruskal-Wallis test). The purpose of these analysis is to address the following questions :

#### **4.3.1 RQ1 : What are the ethical knowledge prevalent among engineering students in Malaysians Public universities (IPTA)?**

When asked to respond to statements that tested the knowledge of ethics, 94.9% answered more than six questions correctly. In other words, only 5.1% answered fewer than five questions correctly. On this basis, it was inferred that respondent's knowledge on ethics is high.

Data was then collapsed into two cells for CPA (respondents with CPA score of <3.00 and >3.00) and ethical knowledge (respondents answering >6questions correct and <5 correct). Analysis based upon a Chi-squared independence test revealed that there was no statistically significant relationship between CPA score and knowledge score.

The data violate the stringent assumption of One-Way ANOVA (refer to appendix 2), hence a non-parametric Kruskal-Wallis Test was performed on the data. Further analysis as shown in Table 4.1 revealed that significant differences existed between all IPTAs in the level of ethical knowledge ( $\chi^2 = 22.852, p < 0.05$ )

**Table 4.1**  
**Kruskal-Wallis Test between IPTAs**  
**by level of ethical knowledge**

Element	IPTAs	Mean Rank	<i>p</i> -value
Knowledge score	uitm	423.8	0.004
	um	399.6	
	upm	396.9	
	ukm	391	
	usm	363.5	
	utm	350.1	
	uia	334.1	
	unimas	312.4	
	ums	273.6	

**4.3.2 RQ2 : What are the propensity to use ethical knowledge for problem solving activities ?**

The respondents were given 4 vignettes to examine (i) what extent they believe individual/groups was ethical or unethical (ii) likelihood the respondents would perform the same action and (iii) respondent’s perceptions on whether his/her peers would performed the same action. The results of the analysis on each vignette are as follows :

### **Vignette 1 (ACADEMIC)**

Bill is writing a paper in his engineering class on one of the 100 largest companies but his paper is lacking a solid conclusion. He vaguely remembers reading something in engineering magazine that could strengthen his point and make a great ending to his paper. Unfortunately Bill cannot remember the date of publication and trying to look through all of the recent issues sounds too time consuming. So Bill instead decides to make up the reference and add it to his paper, thinking the lecturer won't check them anyway.

### **Vignette 2 (ACADEMIC)**

Agnes and her friend Lily are enrolled in a class of 250 students, a large lecture with compulsory attendance. The lecturer teaches straight from the book and the material isn't very interesting. Agnes and Lily work out a system where they trade off going to class and just sign each other's name as the attendance sheet went around. In this way they don't "waste" their time or get penalized for missing classes.

### **Vignette 3 (ENGINEERING)**

Salman Khan is employed as a chemical engineer at ABC Manufacturing. Although he does not work with hot metals himself, he supervises workers who are exposed to hot metals eight hours a day, five days a week. Salman becomes concerned when several workers developed respiratory problems and complain about "those bad smelling fumes from the hot metals". When Salman asks his superior, Karam Singh, about air quality in the workplace, the reply is that the workplace is in full compliance with OSHA (Occupational Safety and Health) guidelines. However, Salman also learns that OSHA guidelines apply to a relatively small percentage of chemicals in ABC manufacturing . Salman Khan decides to drop the matter.

### **Vignette 4 (ENGINEERING)**

Ibrahim is a structural designer. After constructing a new and innovative building, he finds an error in his calculations that could result in its collapse under severe wind conditions. Such a collapse would endanger the occupants. Ibrahim advises the architect and client. But they (the architect and client) ask Ibrahim to keep silent on this matter. Ibrahim agrees to their request.

**4.3.2.1 Extent of respondents' belief that individual/groups action was ethical/unethical**

As illustrated in table 4.2, the respondents believed that individual's action on each vignette was unethical, though mildly. In detail, for both academic vignettes, only 59.7% and 68% of respondents believed that individual's/group action in vignette 1 and 2 respectively was unethical.

**Table 4.2  
Mean Responses to Ethical Vignette**

	Vignette 1 (Academic) Mean (S.D.)	Vignette 2 (Academic) Mean (S.D.)	Vignette 3 (Engineering) Mean (S.D.)	Vignette 4 (Engineering) Mean (S.D.)	Overall Mean
To what extent do you believe Individual's/group action was ethical or unethical (scale : 1=ethical to 7=unethical) <b>(ACTION)</b>	4.9 (1.3) (59.7% unethical)	5.2 (1.5) (68% unethical)	4.9 (1.7) (60.6% unethical)	6.0 (1.5) (83.8% unethical)	5.25
The likelihood you would perform the same action (scale : 1=low to 7=high) <b>(LIKELIHOOD)</b>	3.6 (1.4) (43% low)	3.5 (1.7) (49.7% low)	3.2 (1.5) (57.1% low)	2.3 (1.5) (77.1% low)	3.15
Your perception on whether your peers/colleagues would have performed the same action (scale : 1=low to 7=high) <b>(PERCEPTION)</b>	4.3 (1.3) (23.3% low)	4.4 (1.5) (25.5% low)	3.7 (1.4) (42.1% low)	3.0 (1.6) (61.8% low)	3.85
<b>HALO</b> (The difference between PERCEPTION and LIKELIHOOD)	0.7	0.9	0.5	0.7	0.7

For both engineering vignettes, only 60.6% and more than 80% of respondents perceived that individual's/group action in vignette 3 and 4 was unethical. In short, except for

vignette 4, less than 70% of respondents believed that individual's/groups action in all other vignettes (academic and engineering) was unethical.

Due to the data used in the study, which was ordinal, a non-parametric Friedman test was performed. Analysis revealed that respondents' belief on each individual's/groups actions (ethical/unethical) differs significantly on each vignette ( $\chi^2 = 447.343$ ,  $p < 0.05$ ) as shown in Table 4.3(a). It appears that respondents' belief in the individual's/groups unethical action was significantly high in vignette 4 (Engineering) but low in Vignette 1 (Academic).

#### **4.3.2.2 Likelihood that respondents would perform the same action**

The findings also suggest that there is less likelihood for respondents to perform the same action. Less than half of respondents revealed that they are less likely to perform the same unethical action in both vignette 1 (academic) and 2 (academic). Only 57.1% of respondents disclosed that they are less likely to perform the same action for vignette 3 (engineering) while less than 80% of them for vignette 4 (engineering). In sum, except for vignette 4, less than 60% of respondents believed to a low degree that they would perform the same action on all academic and engineering vignettes.

Performing the same test suggest that respondents differs significantly ( $\chi^2 = 393.538$ ,  $p < 0.05$ ) on the likelihood that they would perform the same action on each vignettes (refer to Table 4.3b). Analysis also demonstrated that respondents' likelihood in performing the same action appears to be significantly low in vignette 4 (Engineering) but high in Vignette 1 (Academic)

#### **4.3.2.3 Respondent's perception on whether his/her peers would perform the same action**

As pointed out in the same table, the study shows that respondents' perception on whether their peers/colleagues would have performed the same action is also to a certain extent low. For both academic vignettes, less than 30% of them perceived at a very low degree that their peers/colleagues would have performed the same action in both vignette 1 and 2. But only 2.1% and 61.8% of respondents also perceived at a low degree that their peers/colleagues would have performed the same action in vignette 3(engineering) and vignette 4(engineering) respectively. In short, except for vignette 4, less than half of respondents perceived at a low degree that their peers/colleagues would have performed the same action in each vignettes.

Using the same test as shown in Table 4.3(c) also suggested that respondents' perception in the aforementioned context differs significantly ( $\chi^2=459.130, p<0.05$ ) in each vignette. It also demonstrated that they have a significantly low perception in vignette 4 (Engineering) but high in Vignette 2 (Academic).

**Table 4.3(a)**  
**Friedman Test Analysis Results**

ACTION*	Mean Rank
Vignette 1	2.10
Vignette 2	2.43
Vignette 3	2.23
Vignette 4	3.24
$\chi^2=447.343$	
* $p<0.05$	

**Table 4.3(b)**  
**Friedman Test Analysis Results**

LIKELIHOOD*	Mean Rank
Vignette 1	2.85
Vignette 2	2.77
Vignette 3	2.59
Vignette 4	1.79
$\chi^2=393.538$	
* $p<0.05$	

**Table 4.3(c)**  
**Friedman Test Analysis Results**

PERCEPTION*	Mean Rank
Vignette 1	2.86
Vignette 2	2.95
Vignette 3	2.37
Vignette 4	1.82
$\chi^2=459.130$	
* $p<0.05$	



#### 4.3.2.4 Correlation analysis among research variables

As demonstrated in Table 4.4, analysing the correlation among the research variables (ACTION, LIKELIHOOD, PERCEPTION) of each vignette shows that the variable ACTION is inversely correlated with LIKELIHOOD and PERCEPTION. Therefore it can be deduced that the more the respondents feel the action is unethical, (i) the less likelihood they would perform the same action and (ii) the lower their perception on their peers/colleagues would have performed the same action.

**Table 4.4**  
**Correlation Matrix Analysis Results**

	ACTION Vignette1	ACTION Vignette2	ACTION Vignette3	ACTION Vignette4
LIKELIHOOD Vignette 1	-0.326**			
PERCEPTION Vignette 1	-0.062***			
LIKELIHOOD Vignette 2		-0.460**		
PERCEPTION Vignette 2		-0.075*		
LIKELIHOOD Vignette 3			-0.628**	
PERCEPTION Vignette 3			-0.373**	
LIKELIHOOD Vignette 4				-0.610**
PERCEPTION Vignette 4				-0.356**

\*\*\* Correlation is significant at the 0.1 level (2 tailed)

\*\* Correlation is significant at the 0.01 level (2 tailed)

\*Correlation is significant at the 0.05 level (2 tailed)

#### 4.3.2.5 Differences between IPTAs on research variables

This study also seeks to determine whether there were any differences between IPTAs in terms of the overall research variables (ACTION, LIKELIHOOD, PERCEPTION) after averaging all the rating scores of these variables on each vignette. Employing a non-

parametric Kruskal-Wallis test, the study shows significant differences across IPTAs in terms of ACTION ( $\chi^2 = 22.527$ ,  $p < 0.05$ ), LIKELIHOOD ( $\chi^2 = 19.206$ ,  $p < 0.05$ ), and PERCEPTION ( $\chi^2 = 22.250$ ,  $p < 0.05$ ). The results are illustrated in Table 4.5(a),(b) and (c). Overall, in terms of the variable ACTION, the respondents from UKM appear to believe individual's action as being significantly more unethical. Similarly, respondents from UKM also show a significantly less likelihood that they would perform the same action and that their peers/colleagues would less likely performed the same action. Nevertheless, other IPTAs rank significantly differently on ACTION, LIKELIHOOD and PERCEPTION.

**Table 4.5(a)**  
**Kruskal-Wallis Test results**

<b>Element</b>	<b>IPTAs</b>	<b>Mean Rank</b>	<b>P-value</b>
ACTION (overall)	UKM	434.8	0.004
	UNIMAS	415.1	
	UIA	389.4	
	UTM	384.6	
	UMS	371	
	UPM	366.8	
	UiTM	355	
	UM	344.7	
	USM	318.8	

**Table 4.5(b)**  
**Kruskal-Wallis Test results**

<b>Element</b>	<b>IPTAs</b>	<b>Mean Rank</b>	<b>P-value</b>
LIKELIHOOD (overall)	UM	419.3	0.014
	USM	391.8	
	UIA	380.8	
	UTM	379.5	
	UiTM	378	
	UMS	350.3	
	UPM	342.9	
	UNIMAS	337.1	
	UKM	311.7	

**Table 4.5(c)**  
**Kruskal-Wallis Test results**

Element	IPTAs	Mean Rank	P-value
PERCEPTION (overall)	UIA	439.9	0.004
	UPM	420.6	
	UNIMAS	397.3	
	UTM	388.2	
	UM	375.1	
	UMS	369.8	
	USM	359.8	
	UiTM	344.1	
	UKM	297.2	

#### 4.4 RQ3 : What are the level of ethics amongst students in IPTA?

To probe further into the possible level of ethics amongst respondents, Table 4.6 indicated that majority (39.9%) responded to possible Kohlberg's stage 4, followed by stage1 (22.1%) and stage 5 (19.5%). A Chi-square Goodness of fit test indicated a significant differences in the frequency of Kohlberg stages responses ( $\chi^2=449.689$ ,  $p<0.05$ ). An individual in the aforementioned stage 4 responses reflected one's obligation to the law override's one obligation of loyalty to one's family, friends and groups. On the other hand, stage 1 response implies one's good behavior is associated with avoiding punishment. Stage 5 responses suggest that ones' right action is that which protects the rights of individual according to rules agreed upon by the whole society.

**Table 4.6**  
**Kohlberg responses**

<i>Vignette</i>	<b>N</b>	<b>Freq %</b>
<p>A woman was near death from a unique kind of cancer. There is a drug that might save her. The drug costs \$4,000 per dosage. The sick woman's husband, Heinz, went to everyone he knew to borrow the money and tried every legal means, but he could only get together about \$2,000. He asked the doctor scientist who discovered the drug for a discount or let him pay later. But the doctor scientist refused. What should Heinz do?</p>		
<b>Responses :</b>		
Heinz should not steal the drug because he might be caught and sent to jail	163	22.1
It is right for Heinz to steal the drug because it can cure his wife and then she can cook for him	2	0.3
Heinz should steal the drug. He probably will go to jail for a short time for stealing but his in-laws will think he is a good husband	28	3.8
As her husband, Heinz has a duty to save his wife's life so he should steal the drug. But it's wrong to steal, so Heinz should be prepared to accept the penalty for breaking. the law.	294	39.9
Heinz should steal the drug because everyone has the right to life regardless of the law against stealing. Should Heinz be caught and prosecuted for stealing then the law (against stealing) needs to be reinterpreted because a person's life is at stake.	144	19.5
Heinz should steal the drug to save his wife because preserving human life is a higher moral obligation than preserving property.	106	14.4
N = 737		

#### **4.5 An analysis of the content and delivery of ethic courses in IPTA.**

The study also seeks to examine the content and delivery of ethics courses in IPTA.

Table 4.7 (a) and (b) shows the result.

**Table 4.7(a)**  
**Ethics courses evaluation**

	<b>Yes</b>	<b>No</b>
Ethics has been incorporated in other subjects	562 (75.7%)	180 (24.3%)
Have you taken any ethics courses/subjects in your current programme?	514 (69.1%)	230 (30.9%)

More than 75% of respondents showed that Ethics has been incorporated in other subjects and that more than 60% have indicated that they have taken an ethics course/subjects in their current programme.

Majority of respondents (>50%) revealed that their ethics classes were conducted based on theories followed by case study (26%) and medium group (20-60 students per class).

A greater proportion (45.8%) of respondents prefer discussion followed by lecture (20.2%). On the average, the number of students in ethics class was 96 (95.46) and the mean contact hours per week in the ethics class was 3 (2.86)

**Table 4.7(b)**  
**Ethics courses evaluation**

	Freq	%
How was the ethics class being conducted ?		
case study	135	26.0
theoretical	279	53.8
medium group (between 20-60 students per class)	89	17.1
small group (less than 20 students per class)	16	3.1
What do you prefer in the ethics class?		
lecture	104	20.2
discussion	236	45.8
audiovisual methods	83	16.1
experiential methods	92	17.9
Number of students in ethics class (mean=95.46)		
Number of contact hours per week in the ethics class (mean=2.86)		

#### **4.5.1 Effectiveness of ethics course (overall)**

The effectiveness of the ethics course was evaluated in term of three components : CONTENT, DELIVERY and ASSESSMENT. Table 4.8(a), (b), (c) and Figure 4.1, 4.2 and 4.3 presents a summary of this analysis.

Overall, respondents moderately agree that the ethics course was effective in terms of previously mentioned components. The analysis suggests that effectiveness of this course can be improved by focusing more on its Delivery, followed by Assessment and Content.

#### **4.5.2 Effectiveness of ethics course (DELIVERY)**

In terms of DELIVERY, elements that need improvement in terms of priority were indicated in Figure 4.1. Some of these are as follows: The instructor's/lecturers should

- (i) Ensure students understood the material.
- (ii) Make certain that they were interesting.
- (ii) Facilitate discussion/participation in class
- (iii) Organize lectures
- (iv) Encourage students to devel

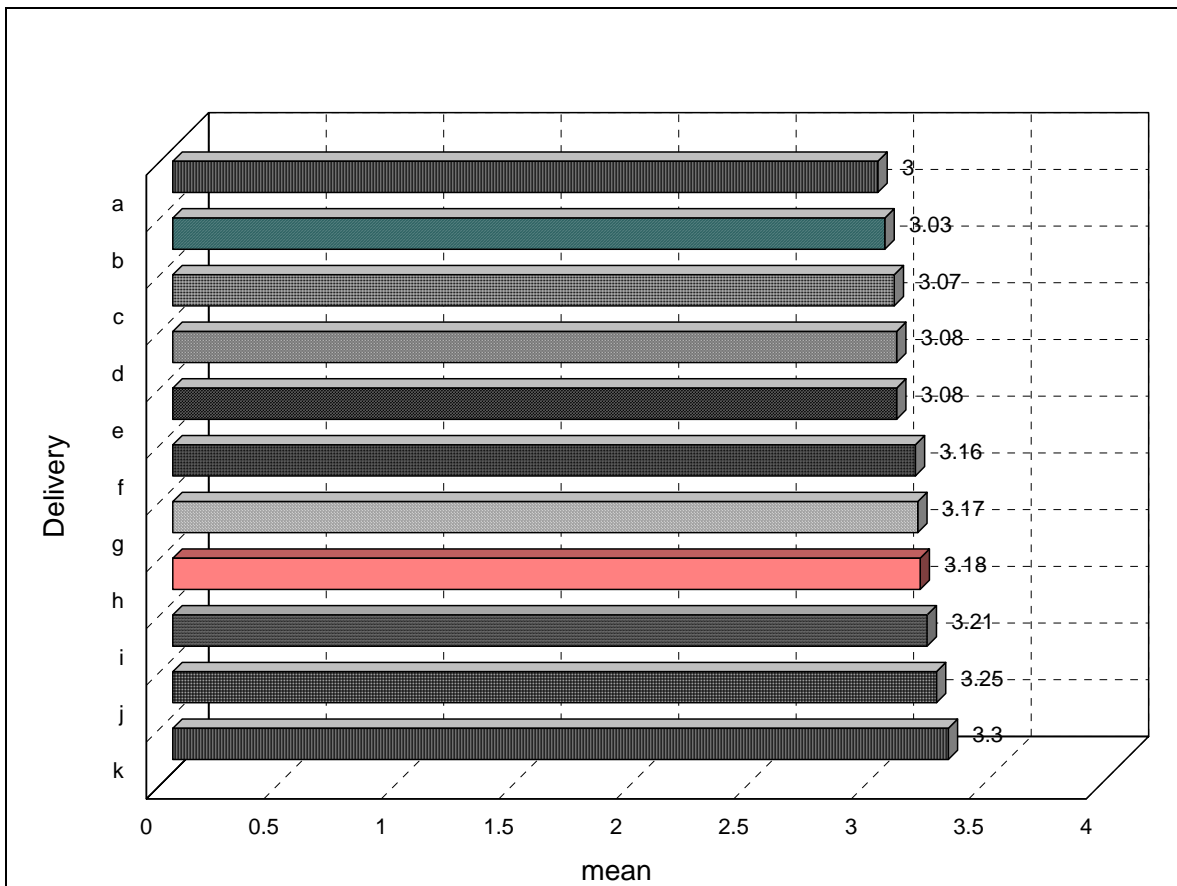
**Table 4.8(a)**  
**Ethics courses evaluation (DELIVERY)**

<b>ITEM</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>Mean</b>	<b>S.D.</b>
	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>		
The time allotted for the course was appropriate	2.1	6.2	43.9	23.8	23.0	1.0	3.18	0.69
If used, the films used by the instructor were incorporated into the course	4.1	7.2	30.9	27.2	20.4	10.3	3.17	0.84
Practical assignments were good measures of course evaluation	2.5	8.3	36.2	39.7	11.9	1.3	3.30	0.76
The instructors/lecturers checked to see if student were understanding the material.	5.0	13.7	36.8	23.9	16.8	3.9	3.00	0.85
The instructor's/lecturer's lectures were well-organized	4.0	11.8	38.7	26.4	18.3	0.8	3.08	0.82
The instructor's/lecturer's were interesting	6.2	14.1	32.8	28.7	17.7	0.6	3.03	0.91
The instructor's/lecturer's were informative	3.3	10.2	36.4	34.7	14.5	1.0	3.21	0.80
The instructor's/lecturer's facilitated discussion/participation in class	3.7	11.8	44.5	25.0	12.5	2.5	3.07	0.78
The instructor/lecturer demonstrated respect for alternative viewpoints from students	2.5	10.2	39.7	28.3	17.3	1.9	3.16	0.76
The instructor/lecturer used examples in an effective manner.	2.9	9.6	37.8	37.8	11.0	1.0	3.25	0.78
The instructor/lecturers encouraged students to develop their own examples	4.0	13.5	35.8	27.7	14.3	4.6	3.08	0.84

**OVERALL MEAN = 3.11**

Scale : 1=Strongly Disagree to 4 = Strongly Agree  
5=Neutral  
6=Does not apply

**Figure 4.1**  
**Ethics courses evaluation (DELIVERY)**



- a. The instructors/lecturers checked to see if student were understanding the material.
- b. The instructor's/lecturer's were interesting
- c. The instructor's/lecturer's facilitated discussion/participation in class
- d. The instructor's/lecturer's lectures were well-organized
- e. The instructor/lecturers encouraged students to develop their own examples
- f. The instructor/lecturer demonstrated respect for alternative viewpoints from students
- g. If used, the films used by the instructor were incorporated into the course
- h. The time allotted for the course was appropriate
- i. The instructor's/lecturer's were informative
- j. The instructor/lecturer used examples in an effective manner.
- k. Practical assignments were good measures of course evaluation

Scale : 1=Strongly Disagree to 4 = Strongly Agree



**Table 4.8(b)**  
**Ethics courses evaluation (ASSESSMENT)**

ITEM	1	2	3	4	5	6	Mean	S.D
	%	%	%	%	%	%		
When used, in class exercises (case study, role playing, etc) helped me understand the material.	3.1	4.4	34.4	45.0	10.0	3.1	3.40	0.75
Assessment procedures (paper tests, presentation etc) allowed me to demonstrate what I had learned.	3.5	8.5	39.3	35.1	11.6	2.1	3.23	0.78
Tests, examination and case study were good measures of course material.	5.8	12.1	34.9	32.9	13.3	1.0	3.11	0.89
I learn a lot to be ethical on this class	3.7	9.8	41.6	27.9	14.8	2.1	3.13	0.78
I learn a lot about ethics in this class	3.5	8.9	41.6	31.6	13.3	1.2	3.18	0.78

**OVERALL MEAN = 3.22**

Scale : 1=Strongly Disagree to 4 = Strongly Agree

5=Neutral

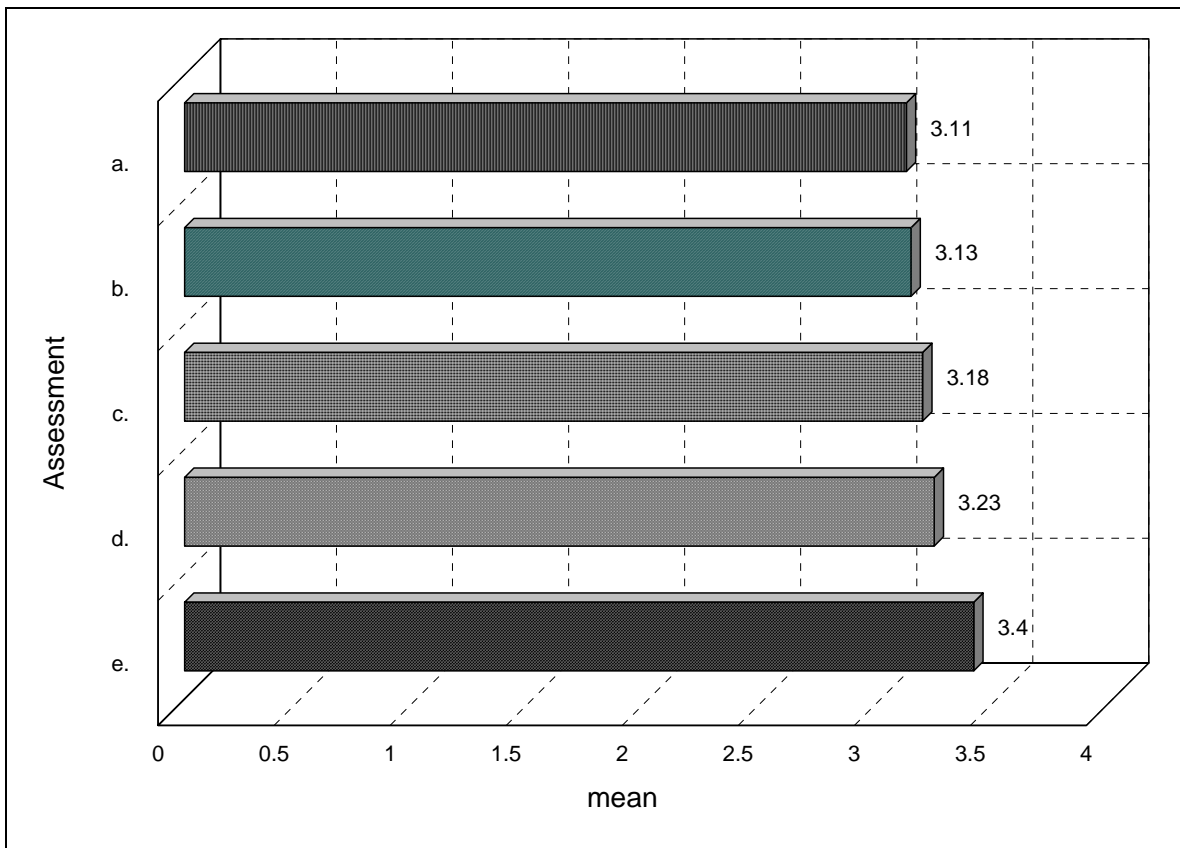
6=Does not apply

### 4.5.3 Effectiveness of ethics course (ASSESSMENT)

In terms of ASSESSMENT, elements that need improvement in terms of priority were indicated in Figure 4.2. Some of these are as follows:

- (i) Review test, examination and case study as measurement of course material.
- (ii) Learn to be ethical in class.
- (iii) Learn about ethics in class.
- (iv) Re-evaluate assessment procedures to demonstrate what student had learned.
- (v) Assess (case study, role playing etc) to aid in understanding the material.

**Figure 4.2**  
**Ethics courses evaluation (ASSESSMENT)**



- a. Tests, examination and case study were good measures of course material.
- b. I learn a lot to be ethical on this class
- c. I learn a lot about ethics in this class
- d. Assessment procedures (paper tests, presentation etc) allowed me to demonstrate what I had learned.
- e. When used, in class exercises (case study, role playing, etc) helped me understand the material.

Scale : 1=Strongly Disagree to 4 = Strongly Agree

**Table 4.8(c)**  
**Ethics courses evaluation (CONTENT)**

ITEM	1 %	2 %	3 %	4 %	5 %	6 %	Mean	S.D
The course content achieved the course objectives	3.3	8.5	45.9	27.0	14.3	1.0	3.14	0.75
Ethic courses should be made compulsory	4.1	5.6	24.5	49.6	15.4	.8	3.43	0.82
The assigned reading material (text, papers, etc) was appropriate for the course.	4.2	9.8	41.1	27.8	15.1	1.9	3.11	0.80

**OVERALL MEAN = 3.23**

**OVERALL MEAN (Delivery, Content & Assessment) = 3.18 (SD=0.49)**

Scale : 1=Strongly Disagree to 4 = Strongly Agree

5=Neutral

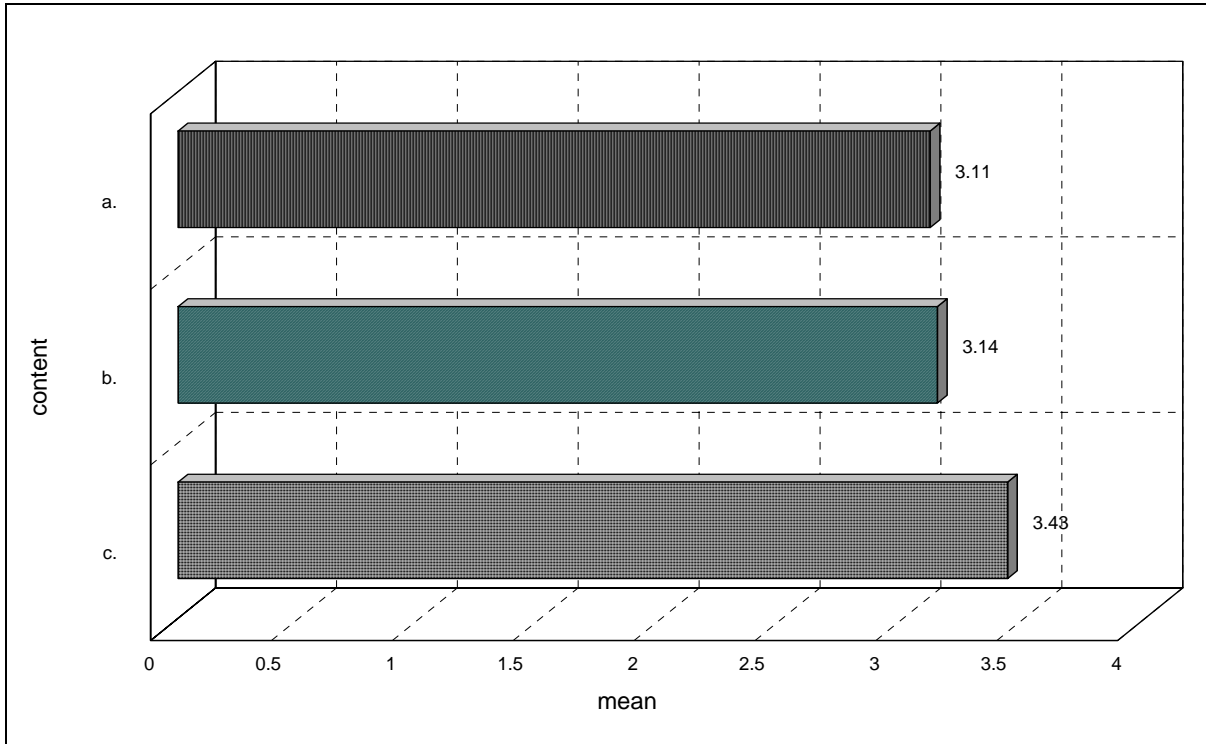
6=Does not apply

#### **4.5.4 Effectiveness of ethics course (CONTENT)**

In terms of CONTENT, elements that need improvement in terms of priority were indicated in Figure 4.3. Some of these are as follows:

- (i) Reassess the suitability of reading material (text, papers, etc) to the course.
- (ii) Reappraise course content so that it will meet its objective.
- (iii) Ensure that the ethic course as a compulsory subject.

**Figure 4.3**  
**Ethics courses evaluation (CONTENT)**



- a. The assigned reading material (text, papers, etc) was appropriate for the course.
- b. The course content achieved the course objectives
- c. Ethic courses should be made compulsory

Scale : 1=Strongly Disagree to 4 = Strongly Agree

#### 4.5.4.1 Differences between IPTAs in their level of ethics course effectiveness

Additional analysis revealed that IPTAs differs significantly in their level of ethics course effectiveness in terms of overall course instruction ( $\chi^2=57.592, p<0.05$ ). It appears that ethics course is significantly more effective from UIA compared to other institutions. The breakdown by IPTAs in terms of DELIVERY, CONTENT and ASSESSMENT are shown in Table 4.9(a), (b) and (c) (see appendix 3)

**Table 4.9**  
**Kruskal-Wallis Test results (overall instruction)**

<b>Instruction(overall)</b>		
	Mean Rank	<i>p</i> -value
uia	345.3	0.000
ukm	323.3	
uitm	303.6	
utm	242.4	
unimas	240.6	
usm	226.3	
upm	222.9	
um	209	
ums	175.3	

**Table 4.9 (a)**  
**Kruskal-Wallis Test results (Delivery)**

<b>Element(alldelivery)</b>		
	Mean Rank	<i>p</i> -value
uia	127.6	0.002
uitm	118.7	
ukm	106.9	
usm	82.5	
utm	80.7	
unimas	75	
upm	69.2	
ums	68.8	
um	67.1	

**Table 4.9 (b)**  
**Kruskal-Wallis Test results (Content)**

<b>Element(allcontent)</b>		
	Mean Rank	<i>p</i> -value
uia	255.4	0.000
ukm	207	
uitm	182.2	
unimas	170	
usm	162.7	
um	152.4	
utm	151.9	
upm	149.4	
ums	98.6	

**Table 4.9(c)**  
**Kruskal-Wallis Test results (Assessment)**

<b>Element (allassmt)</b>		
	Mean Rank	<i>p</i> -value
uia	217.1	0.000
ukm	200	
uitm	191.1	
unimas	159.1	
usm	143.4	
upm	140.2	
utm	134.5	
um	129.5	
ums	97.3	

**4.5.4.2 Analysis in level of effectiveness (specific ethic course vs incorporating ethics in other subjects)**

A Mann-Whitney test was performed as shown in Table 4.9.1. Analysis revealed that having (or not having) a specific ethic course differs significantly in their level of effectiveness ( $\mu=12337.5$ ,  $p<0.005$ ) as compared to incorporating it in other subjects.

**Table 4.9.1**  
**Mann-Whitney Test results (Course effectiveness)**

<b>Instruction(effectiveness)</b>			
		Mean Rank	<i>p</i> -value
specific ethic course	yes	267.94	0.000
	no	194.74	

# **CHAPTER 5**

## **CONCLUSIONS AND IMPLICATIONS OF THE STUDY**

This study has determined the prevailing ethical knowledge among public university students in Malaysia. It has also discovered the predisposition to use ethical knowledge specifically for academic and engineering situations and established the level of ethics amongst the aforesaid students and analyzed the content and delivery of ethics courses in these universities. The research reached a number of conclusions and avenues for future area of research.

## **5.1 Introduction**

In this section, a review and discussion of the significant findings for each objectives of the study will be presented. Implications of the findings are based on the empirical evidence conducted.

### **5.1.1 Ethical knowledge pervasive among engineering students in Malaysian Public Universities.**

This study has shown that respondent's knowledge on ethics was high and that their CPA score has no relationship with their knowledge score on ethics. There were significant differences between the score of all IPTAs in their level of ethical knowledge. This may be attributed to the influence of different backgrounds of respondents as well as curriculum of IPTAs.



### 5.1.2 Propensity to use ethical knowledge for problem solving activities.

The respondents believed that individual's/groups action on each four vignettes was somewhat unethical, and that their belief differs significantly on each vignette (academic or engineering). In this study, very few respondents believed that the individual's/groups action in each vignettes was very unethical. It was also surprising to discover that the respondents' belief in the individual's/groups unethical action was significantly high on only one engineering vignette (vignette 4) but not on other engineering vignette (vignette 3). In other words, slightly more than half of respondents believed that they were less likely to perform the same action on vignette 3 and 4 only. Their differences in belief stem from the fact that respondents were more concerned at the consequences of each action taken by individual/groups; in this case the consequences of their action have greater impact on the overall public in vignette 4 and on other employees in vignette 3.

Similarly, the findings, which are of growing concern, revealed that less than half of respondents perceived at a low degree that they would perform the same action particularly on the academic vignettes. This likelihood of performing the same action differs significantly on each vignette and their likelihood appears to be significantly low on both engineering vignettes. Nevertheless, it appears that respondents in this study have some basic ethical principle albeit at a low degree.

The respondents' perception on whether their peers/colleagues would have performed the same action is also somewhat low and that this perception differs significantly in each

vignette. Their perception also appears to be significantly low on both engineering vignettes compared to the other academic vignettes. This may be influenced by their concern on impact of the consequences of each action taken by individual/groups. It was also alarming to discover that not all respondents perceived at a low degree that their peers/colleagues would have performed the same action in each vignette. This shows that, not all respondents have trust on their peers/colleagues.

In spite of the above scenario, findings suggest that the more the respondents felt a particular action is unethical, the less likelihood they perceived themselves performing the same action as well as less likelihood they perceived their peers/colleagues performing the same action.

Overall, the study also demonstrated significant differences among respondents across IPTAs in terms of ACTION, LIKELIHOOD and PERCEPTION. The perception amongst IPTAs on each of the above variables (in terms of ACTION, LIKELIHOOD and PERCEPTION) differs significantly.

### **5.1.3 Ethics level amongst IPTA students**

Majority responded to possible Kohlberg's stage 4, followed by stage 1 and stage 5. It can be deduced that majority of the respondents 'obligation to the law, override's their obligation of loyalty to their family, friends and groups'. This is followed by respondent's belief that 'good behavior is associated with avoiding punishment'. The finding of the study should be viewed with great concern and wariness by curriculum

developer in IPTAs. The majority response on Kohlberg's stage 4 and 1 denotes that students' level of ethics is more influenced by external forces such as law and punishment rather than on their self-awareness to behave ethically. As quoted by Clark (2003), Justice Elizabeth B. Lacy of the Virginia Supreme Court, U. S. A., stressed that "legality is the minimum standard of action to follow; an individual's action should be based on what is right and not merely what is technically legal". Thus, the education system must be able to cultivate and instill good values and emphasis on self-imposition of ethical behavior.

#### **5.1.4 Analysis Of the Content, Delivery and Assessment Of Ethics courses in IPTA**

Findings of the study pointed out that respondents moderately agree that the ethics course was effective in terms of three components namely by content, delivery and assessment. Therefore the effectiveness of the course can be improved by focusing more on its delivery, followed by assessment and finally its content.

Additional analysis revealed that in terms of overall course instruction, the level of ethics course effectiveness across IPTAs differs significantly. The study also appears to show that ethic course is significantly more effective at UIA compared to other institutions. This is probably due to the environmental factor, specifically the religious setting have influence on respondent's ethical behavior (Trevino, 1986; Justin et.al., 2004). This finding is in congruence with Terpstra et. al (1993), who asserts that religious beliefs may be important influences on individual's ethic level. Similarly, some studies which

considered religion as a very important element in making daily decisions was reported to accept less questionable ethical behaviors (Smith and Oakley, 1996)

Respondents also perceived that having a specific ethics course is significantly effective compared to incorporating ethics in other subjects. This finding is consistent with the research done by Gautshi and Jones (1998) and Schoenfeldt et.al (1991) which shows the effect of an ethics course (business) in enhancing the ability of students to recognize ethical issues. This study also shows that a greater proportion of respondents prefer discussion, followed by lecture.

## **5.2 Contributions Of Research**

The main contribution of this study lies in its being among the early studies on ethics specifically on engineering students in Malaysian Public Universities. This study also helps to enrich the literature on ethics in particular and the effectiveness of ethics in terms of its content and delivery in IPTA.

The research contributes as guidelines for academics. The guidelines can lead to enhancement of teaching material as well as improvement of the syllabus and curriculum of ethics courses, which will be discussed further in Section 5.3 below. The proposed module is shown in Appendix 4.

This study also acts as a pilot study for further research. It is hoped that it is also a source of information and guidelines in terms of its empirical framework, methods and findings.

### 5.3 Recommendations

Based on the findings of the study, the following recommendation should be implemented in terms of the ethics module to be used by IPTAs. Due to time constraints, we proposed to develop a module of ethics based on Ralph Tyler's Rationale Behavioral Model (1949).

This model is one of the best known technical-scientific models in which he outlined a rationale for examining the problems of curriculum and instruction. His theory was based on four fundamental questions such as : i) what educational purposes (objectives)?, ii) what educational experiences can be provided that are most likely to attain these purposes? iii) how can these educational experiences be effectively organized? and iv) how can we determine whether these purposes are being attained?

Tyler placed a big emphasis on the formulation of behavioral objectives with emphasis on significant changes in students' pattern of behavior. According to Tyler, it is important to recognize statements of objectives to be a statement of changes, which takes place in the students. These concerns are then translated into a technical-scientific model which forms as a sequence of productive thinking procedures involving diagnosis of need, formulation of objectives, selection of content, organization of content and selection of learning experiences, organization of learning experiences and finally evaluation of the curriculum and revising those aspects that did not prove to be effective.

In detail, the curriculum should answer the following questions:

- a) *What is the overall intent of the educational program and its component parts? It means, what are the goals? These may be broad, pertaining to the program as a whole or more specific, pertaining to a single rotation or even a single lecture. However, they are generally conceptual in nature, describing the desired end-point.*
- b) *What specific skills or changes in behavior should the learners be able to demonstrate upon completion of the program? Unlike goals, the program objectives must be distinct, observable or measurable skills or behaviors. Attainment of the program objectives is evidence that the goals have been achieved.*
- c) *How will the skills or changes in behavior be taught? A number of methods are used either singly or in combination to take participants from the starting point to attainment of the program objectives. Typically these include clinical experiences, lectures, reading assignments and other special educational activities such as tutorials, skills workshops and computer simulations.*
- d) *How will program success be measured? What system of evaluation exists to demonstrate that participants meet educational objectives?*
- e) *How will information about the program's strengths and weaknesses be collected and used to improve the program? Meaning, how is feedback solicited and used?*
- f) *What is the subject matter upon which the program is based? In other words, what is the program content?*

Thus in order to develop an engineering curriculum, the activity in our study will be as follows : collecting & analysing syllabus, determining topic, content & objective of courses, designing curriculum & implementing teaching method, drafting of module (1<sup>st</sup> & 2<sup>nd</sup>) and evaluation by experts and finalizing the module. The expert's evaluation report and their comments is shown in appendix 4b.

#### **5.4 Limitations of Study**

The scope of the research was confined to final year students and the sample was taken among engineering students in IPTAs. The findings might be more meaningful if a wider sample, such as business students or other engineering students from other IPTAs such as Kolej Universiti or IPTS, were included in the survey.

In determining the ethics level of respondents, a scenario adapted from Kohlberg was used to indicate the possible stage responses. Even though the reliability and validity of this section was checked, a more established and reliable instrument, which is less complicated and less lengthy than the DIT, tailored especially for Asian students could be used.

The use of questionnaire as the only instrument of the study may limit the understanding and discussion on the outcome of the study. The finding might be more comprehensive if other additional instruments or methods such as the interview or case study were carried out.

## 5.5 Further Research

An examination of student perceptions of the action depicted in the vignettes indicates that respondents perceived all types of dilemma differently. Future research should evaluate whether the differences in individual perceptions regarding engineering and non-engineering ethical dilemmas found in this study persist once the individuals enter the workforce. Other study can also explore the constraints faced by educators in educating or instilling ethical values to students. Other similar study can also be conducted for engineering or business graduates employed in various industries on other ethical issues such as: what are the incentives or environments that stimulate and maintain ethical behavior? Will code of ethics help?

Although the non-parametric statistical methods used in this research are robust, this merits further research to refine and test causality relationships of other variables such as ethics level and propensity to use ethical knowledge for problem solving activities. Additionally, studies designed to correlate these preceding variables to actual behavior would be of great interest. It would also be useful to conduct longitudinal studies to determine if the increases in ethics level attained through various interventions are sustained.



## NPar Tests

## Wilcoxon Signed Ranks Test

## Ranks

		N	Mean Rank	Sum of Ranks
knowledgescore - knowledgescore1	Negative Ranks	12 <sup>a</sup>	11.50	138.00
	Positive Ranks	8 <sup>b</sup>	9.00	72.00
	Ties	8 <sup>c</sup>		
	Total	28		

a. knowledgescore < knowledgescore1

b. knowledgescore > knowledgescore1

c. knowledgescore1 = knowledgescore

Test Statistics<sup>b</sup>

	knowledg escore - knowledg escore1
Z	-1.274 <sup>a</sup>
Asymp. Sig. (2-tailed)	.203

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

**NPar Tests****Wilcoxon Signed Ranks Test****Ranks**

		N	Mean Rank	Sum of Ranks
believe11 - believe1	Negative Ranks	8 <sup>a</sup>	9.13	73.00
	Positive Ranks	10 <sup>b</sup>	9.80	98.00
	Ties	10 <sup>c</sup>		
	Total	28		
believe22 - believe2	Negative Ranks	6 <sup>d</sup>	5.42	32.50
	Positive Ranks	6 <sup>e</sup>	7.58	45.50
	Ties	16 <sup>f</sup>		
	Total	28		
believe33 - believe3	Negative Ranks	5 <sup>g</sup>	5.60	28.00
	Positive Ranks	6 <sup>h</sup>	6.33	38.00
	Ties	17 <sup>i</sup>		
	Total	28		
believe44 - believe4	Negative Ranks	8 <sup>j</sup>	6.25	50.00
	Positive Ranks	4 <sup>k</sup>	7.00	28.00
	Ties	16 <sup>l</sup>		
	Total	28		

- a. believe11 < believe1
- b. believe11 > believe1
- c. believe1 = believe11
- d. believe22 < believe2
- e. believe22 > believe2
- f. believe2 = believe22
- g. believe33 < believe3
- h. believe33 > believe3
- i. believe3 = believe33
- j. believe44 < believe4
- k. believe44 > believe4
- l. believe4 = believe44

Test Statistics<sup>c</sup>

	believe11 - believe1	believe22 - believe2	believe33 - believe3	believe44 - believe4
Z	-.570 <sup>a</sup>	-.528 <sup>a</sup>	-.465 <sup>a</sup>	-.882 <sup>b</sup>
Asymp. Sig. (2-tailed)	.569	.597	.642	.378

- a. Based on negative ranks.
- b. Based on positive ranks.
- c. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
likelihood11 - likelihood1	Negative Ranks	9 <sup>a</sup>	9.22	83.00
	Positive Ranks	8 <sup>b</sup>	8.75	70.00
	Ties	11 <sup>c</sup>		
	Total	28		
likelihood22 - likelihood2	Negative Ranks	7 <sup>d</sup>	8.57	60.00
	Positive Ranks	11 <sup>e</sup>	10.09	111.00
	Ties	10 <sup>f</sup>		
	Total	28		
likelihood33 - likelihood3	Negative Ranks	10 <sup>g</sup>	9.50	95.00
	Positive Ranks	10 <sup>h</sup>	11.50	115.00
	Ties	8 <sup>i</sup>		
	Total	28		
likelihood44 - likelihood4	Negative Ranks	6 <sup>j</sup>	9.17	55.00
	Positive Ranks	13 <sup>k</sup>	10.38	135.00
	Ties	9 <sup>l</sup>		
	Total	28		

- a. likelihood11 < likelihood1
- b. likelihood11 > likelihood1
- c. likelihood1 = likelihood11
- d. likelihood22 < likelihood2
- e. likelihood22 > likelihood2
- f. likelihood2 = likelihood22
- g. likelihood33 < likelihood3
- h. likelihood33 > likelihood3
- i. likelihood3 = likelihood33
- j. likelihood44 < likelihood4
- k. likelihood44 > likelihood4
- l. likelihood4 = likelihood44

Test Statistics<sup>c</sup>

	likelihood11 - likelihood1	likelihood22 - likelihood2	likelihood33 - likelihood3	likelihood44 - likelihood4
Z	-.314 <sup>a</sup>	-1.142 <sup>b</sup>	-.398 <sup>b</sup>	-1.660 <sup>b</sup>
Asymp. Sig. (2-tailed)	.754	.253	.691	.097

- a. Based on positive ranks.
- b. Based on negative ranks.
- c. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
likelihood11 - likelihood1	Negative Ranks	9 <sup>a</sup>	9.22	83.00
	Positive Ranks	8 <sup>b</sup>	8.75	70.00
	Ties	11 <sup>c</sup>		
	Total	28		
likelihood22 - likelihood2	Negative Ranks	7 <sup>d</sup>	8.57	60.00
	Positive Ranks	11 <sup>e</sup>	10.09	111.00
	Ties	10 <sup>f</sup>		
	Total	28		
likelihood33 - likelihood3	Negative Ranks	10 <sup>g</sup>	9.50	95.00
	Positive Ranks	10 <sup>h</sup>	11.50	115.00
	Ties	8 <sup>i</sup>		
	Total	28		
likelihood44 - likelihood4	Negative Ranks	6 <sup>j</sup>	9.17	55.00
	Positive Ranks	13 <sup>k</sup>	10.38	135.00
	Ties	9 <sup>l</sup>		
	Total	28		

- a. likelihood11 < likelihood1
- b. likelihood11 > likelihood1
- c. likelihood1 = likelihood11
- d. likelihood22 < likelihood2
- e. likelihood22 > likelihood2
- f. likelihood2 = likelihood22
- g. likelihood33 < likelihood3
- h. likelihood33 > likelihood3
- i. likelihood3 = likelihood33
- j. likelihood44 < likelihood4
- k. likelihood44 > likelihood4
- l. likelihood4 = likelihood44

Test Statistics<sup>c</sup>

	likelihood11 - likelihood1	likelihood22 - likelihood2	likelihood33 - likelihood3	likelihood44 - likelihood4
Z	-.314 <sup>a</sup>	-1.142 <sup>b</sup>	-.398 <sup>b</sup>	-1.660 <sup>b</sup>
Asymp. Sig. (2-tailed)	.754	.253	.691	.097

- a. Based on positive ranks.
- b. Based on negative ranks.
- c. Wilcoxon Signed Ranks Test

**NPar Tests**

**Wilcoxon Signed Ranks Test**

**Ranks**

		N	Mean Rank	Sum of Ranks
k-level - k-level	Negative Ranks	2 <sup>a</sup>	4.50	9.00
	Positive Ranks	3 <sup>b</sup>	2.00	6.00
	Ties	23 <sup>c</sup>		
	Total	28		

- a. k-level < k-level
- b. k-level > k-level
- c. k-level = k-level

**Test Statistics<sup>b</sup>**

	k-level - k-level
Z	-.408 <sup>a</sup>
Asymp. Sig. (2-tailed)	.683

- a. Based on positive ranks.
- b. Wilcoxon Signed Ranks Test

Descriptive Statistics					
	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
score(knowledge)	740	-.463	.090	.447	.179
Valid N (listwise)	740				

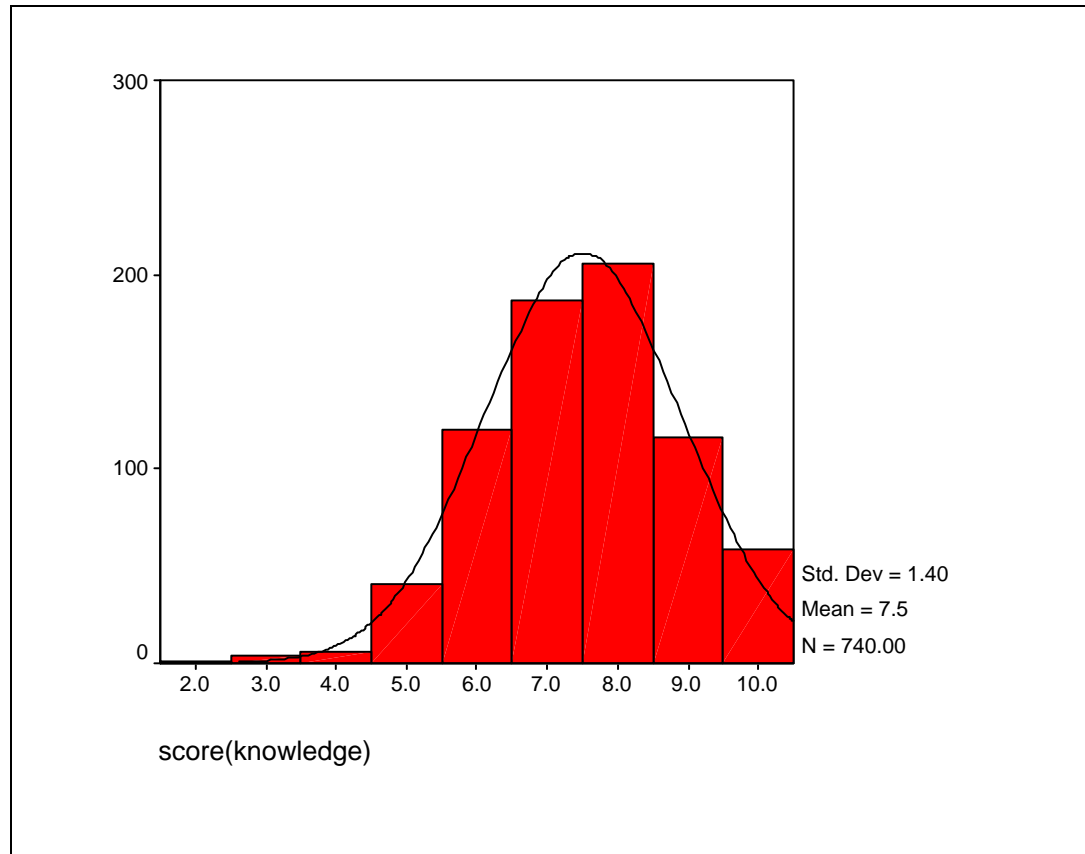
Note : Shows that distribution has a skewness of  $-0.463 < 1.96 (0.090) = 0.176$ , hence, the distribution is negatively skewed.

Tests of Normality			
	Kolmogorov-Smirnov <sup>a</sup>		
	Statistic	df	Sig.
score(knowledge)	.153	740	.000

a. Lilliefors Significance Correction

Note :  $p < 0.05$  hence, normality is not assumed.

## Appendix 2



Note : It is clear from the graph that the fit between the sample data and a normal distribution is poor.



## NPar Tests

## Kruskal-Wallis Test

## Ranks

	institution	N	Mean Rank
ALLDLVRY	utm	19	80.74
	uia	6	127.58
	usm	35	82.53
	uitm	15	118.70
	unimas	12	75.00
	ums	4	68.75
	upm	25	69.16
	ukm	34	106.93
	um	23	67.09
	Total	173	
ALLCTENT	utm	42	151.87
	uia	18	255.44
	usm	63	162.73
	uitm	30	182.15
	unimas	27	170.02
	ums	18	98.56
	upm	39	149.38
	ukm	69	206.99
	um	36	152.43
	Total	342	
ALLASSMT	utm	41	134.48
	uia	18	217.08
	usm	63	143.44
	uitm	31	191.06
	unimas	26	159.10
	ums	14	97.29
	upm	31	140.19
	ukm	64	199.98
	um	31	129.53
	Total	319	

Test Statistics<sup>a,b</sup>

	ALLDLVRY	ALLCTENT	ALLASSMT
Chi-Square	24.061	39.129	39.478
df	8	8	8
Asymp. Sig.	.002	.000	.000

a. Kruskal Wallis Test

b. Grouping Variable: institution

<b>alldelivery</b>	
uia	127.6
uitm	118.7
ukm	106.9
usm	82.5
utm	80.7
unimas	75
upm	69.2
ums	68.8
um	67.1

<b>allassmt</b>	
uia	217.1
ukm	200
uitm	191.1
unimas	159.1
usm	143.4
upm	140.2
utm	134.5
um	129.5
ums	97.3

<b>allcontent</b>	
uia	255.4
ukm	207
uitm	182.2
unimas	170
usm	162.7
um	152.4
utm	151.9
upm	149.4
ums	98.6

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## Ethics Cases

### Case 1:

The company SoftService has developed the software for a new touch-screen voting machine (manages voter I/O, records and tabulates votes, and calculates voting results). The company EasyVote, which manufactures the machine, has contracted with several cities and states to use its machines in its elections. On the strength of these orders, it engages in a major contract with SoftService to install and maintain the software for its machines. SoftService software engineer Lewis is visiting EasyVote one day and learns that problems in the manufacture of the machine mean one in ten is likely to miscount soon during an election. Lewis reports this to her superior, who informs her that it is EasyVote's problem. Lewis decides to keep her mouth shut. [1]

### Case 2:

A programmer analyst, Cruz, was given project responsibility to develop a customer billing and credit system for his employer, a large retail business. He thought the budget and resources given were adequate; however, the budgeted amount was expended before completion of the system. He had continually warned management of impending problems, but was directed to finish the development as soon as possible and at lowest cost. Cruz was forced by management to do this, forgoing many management functions, including the following: audit controls, safeguards, flexibility, error detection and correction capabilities, automatic exception handling, and exception reporting. A "bare bones" system was installed. He was told he could add all the omitted capabilities, in subsequent versions, after production of the initial system.

A difficult, expensive, and extensive conversion to the new system occurred. After the new system was in production, serious problems arose. Many customers received incorrect and incomprehensible billings and credit statements and became outraged. The retail company was unable to correct errors or explain confusing system output. Fraud increased; business and profits declined; and customers suffered much anguish and personal expense. Management blamed the Cruz for the loss. [1]

### Case 3:

A software development company, LoopSoft, has just produced a new software package that incorporates the new tax laws and figures taxes for both individuals and small businesses. The president of LoopSoft knows that the program probably has a number of bugs. He also believes the first firm to put this kind of software on the market is likely to capture the largest market share. The company widely advertises the program. When the company actually ships a disk, it includes a disclaimer of responsibility for errors resulting from use of the program. LoopSoft expects it will receive a number of complaints, queries, and suggestions for modification. The company plans to use these to make changes and eventually issue updated, improved, and debugged versions. The president argues that this is general industry policy and that anyone who buys version 1.0 of a program knows this and will take proper precautions. Because of bugs, a number of users filed incorrect tax returns and were penalized by the IRS. [1]

### Case 4:

The information security manager in a large insurance company was also the access control administrator of a large electronic mail system operated for company business among its employees. The security manager routinely monitored the contents of electronic correspondence among employees. He discovered that a number of employees were using the system for personal purposes: the correspondence included discussions of individual finances, disagreements between married partners, plans for heterosexual and homosexual liaisons, and a football betting pool. The security manager routinely informed the human resources department director and the corporate security officer about



these communications and gave them printed listings of them. In some cases, managers punished employees on the basis of the content of the electronic mail messages. Employees objected to the monitoring of their electronic mail, claiming they had the same right of privacy as they had using the company's telephone system or the internal paper interoffice mail system. [1]

#### Case 5:

A programmer is trying to write a large statistical program needed by his company. Programmers in this company are encouraged to write about their work and to publish their algorithms in professional journals. After months of tedious programming, the programmer has found himself stuck on several parts of the program. His manager, not recognizing the complexity of the problem, wants the job completed in the next few days. Not knowing how to solve the problems, the programmer remembers that a coworker had given him source listings from her current work and from an earlier version of a commercial software package developed at another company. On studying these programs, he sees two areas of code that could be directly incorporated into his program. He uses segments of code from both his coworker and the commercial software, but does not tell anyone or mention it in the documentation. He completes the project and turns it in a day ahead of time. [2]

#### Case 6:

Without malicious intent, a computer hacker was scanning telephone numbers with her computer modem and identifying those numbers that responded with a compute tone. She accessed one of those computers, using a telephone number that she had acquired. Without entering any identification, she received a response welcoming her to an expensive and exclusive financial advisory service offered by a large bank. She was offered, free of charge, the use of some of the services if she would give her name and address. She provided someone else's name and address and used the free promotional services. This stimulated her interest in the services that the bank charges for and gave her sufficient knowledge of access protocol to attempt to use the services without authorization. She gained access to and examined the menus of services offered and instructions for use. However, she did not use the services. By examining the logging audit file and checking with the impersonated customer, bank officials identified the computer hacker and claimed that she used the services without authorization. [3]

#### Case 7:

Professor Barnes is teaching a computer science course that involves a major programming project due at the end of the semester. Professor Barnes assigns the project in the first week of the course and includes a written statement of the project problem. She states that students are welcome to come by her office and ask questions about aspects of the problem statement that are not clear (she has purposely made certain parts of the statement vague and confusing). Roberto, a student in Professor Barnes class, is having a tough semester and does not start working on the project until a week before it is due. Upon reading the problem statement, he is confused and seeks out the Professor for help. When he asks Professor Barnes for some clarification on the project, she says it is much too late for him to be asking for such help and cuts him off in an abrupt manner. Confused and angry Roberto seeks out a classmate and gets help on clarifying the project problem; the classmate also lets Roberto look at his completed project to get some ideas on how to attack the problem. With little sleep and lots of coffee Roberto finishes the project and gets a passing grade in the course.

References: (Most of the above cases were derives form the below sources.)

1. Mail questionnaire received from a professor at the University of North Florida.
2. "Using the ACM Code of Ethics in Decision Making", *Communications of the ACM*, February 1993.
3. "Self-Assessment Procedure XXII", *Communications of the ACM*, November 1990.

**A.** Instruction: Please tick and fill in where appropriate:

1. Gender:  Male  Female
2. Race:  Malay  Chinese  Indian  Others
3. Religion:  Islam  Buddhism  Christianity  Hindu  
Others: (state) \_\_\_\_\_
4. Degree programme: \_\_\_\_\_
5. Name of Institution: \_\_\_\_\_
6. Type of secondary school attended during Form 4 and Form 5:  
 Maktab Rendah Sains MARA  
 National Secondary School  
 Religious Secondary School  
 National Chinese Secondary School  
 Private Secondary School  
 Technical School
7. Place of Residence when in secondary school:  
 With parents  
 With guardian  
 Hostel  
 Others (state) \_\_\_\_\_
8. Latest CGPA : \_\_\_\_\_

**B.** Instruction: Please tick your answer in the appropriate box provided  
(Y=Yes, N=No)

	Y	N
1. All ethical action correspond with legal system	<input type="checkbox"/>	<input type="checkbox"/>
2. Procedure in dressing neat & orderly as well as eating using fork and spoon in an official feast do not involve ethical questions.	<input type="checkbox"/>	<input type="checkbox"/>
3. Ethical dilemmas are situation in which two or more moral obligation, duties, rights, goods or ideals come into conflict with one another.	<input type="checkbox"/>	<input type="checkbox"/>
4. People actions and principle of conduct can be spoken of as either ethical (right, good or permissive) or unethical (immoral).	<input type="checkbox"/>	<input type="checkbox"/>
5. Ethic is closely related to responsibility. The higher the responsibility, the bigger the freedom gained.	<input type="checkbox"/>	<input type="checkbox"/>
6. Ethics and law are two different issues.	<input type="checkbox"/>	<input type="checkbox"/>
7. An ethical person will obey the law.	<input type="checkbox"/>	<input type="checkbox"/>
8. An engineer who does not comply with a building specification has violated the ethical, legal and courtesy values.	<input type="checkbox"/>	<input type="checkbox"/>
9. A whistle blower (a person who reports on a particular wrong doing) is an integrate part of managing company ethics.	<input type="checkbox"/>	<input type="checkbox"/>
10. Engineers shall build their professional reputation in a manner where the end justify the means	<input type="checkbox"/>	<input type="checkbox"/>

**C.** Instruction: Please read the independent scenarios below and circle the answer that most accurately reflect your thought.

**Scenario 1**

Bill is writing a paper in his engineering class on one of the 100 largest companies but his paper is lacking a solid conclusion. He vaguely remembers reading something in engineering magazine that could strengthen his point and make a great ending to his paper. Unfortunately Bill cannot remember the date of publication and trying to look through all of the recent issues sounds too time consuming. So Bill instead decides to make up the reference and add it to his paper, thinking the lecturer won't check them anyway.

- 1) To what extent do you believe Bill's action was ethical or unethical.
 

1	2	3	4	5	6	7
ethical						unethical
  
- 2) The likelihood you would perform the same action.
 

1	2	3	4	5	6	7
low						high
  
- 3) Your perception on whether your peers/colleagues would have performed the same action
 

1	2	3	4	5	6	7
low						high

**Scenario 2**

Agnes and her friend Lily are enrolled in a class of 250 students, a large lecture with compulsory attendance. The lecturer teaches straight from the book and the material isn't very interesting. Agnes and Lily work out a system where they trade off going to class and just sign each other's name as the attendance sheet went around. In this way they don't "waste" their time or get penalized for missing classes.

- 1) To what extent do you believe Agnes and Lily's action was ethical or unethical.
 

1	2	3	4	5	6	7
ethical						unethical
  
- 2) The likelihood you would perform the same action.
 

1	2	3	4	5	6	7
low						high
  
- 3) Your perception on whether your peers/colleagues would have performed the same action.
 

1	2	3	4	5	6	7
low						high

**Scenario 3**

Salman Khan is employed as a chemical engineer at ABC Manufacturing. Although he does not work with hot metals himself, he supervises workers who are exposed to hot metals eight hours a day, five days a week. Salman becomes concerned when several workers developed respiratory problems and complain about “those bad smelling fumes from the hot metals”. When Salman asks his superior, Karam Singh, about air quality in the workplace, the reply is that the workplace is in full compliance with OSHA (Occupational Safety and Health) guidelines. However, Salman also learns that OSHA guidelines apply to a relatively small percentage of chemicals in ABC manufacturing . Salman Khan decides to drop the matter.

- 1) To what extent do you believe Salman Khan’s action was ethical or unethical.
 

1	2	3	4	5	6	7
ethical				unethical		
  
- 2) The likelihood you would perform the same action.
 

1	2	3	4	5	6	7
low			high			
  
- 3) Your perception on whether your peers/colleagues would have performed the same action.
 

1	2	3	4	5	6	7
low			high			

**Scenario 4**

Ibrahim is a structural designer. After constructing a new and innovative building, he finds an error in his calculations that could result in its collapse under severe wind conditions. Such a collapse would endanger the occupants. Ibrahim advises the architect and client. But they (the architect and client) ask Ibrahim to keep silent on this matter. Ibrahim agrees to their request.

- 1) To what extent do you believe Ibrahim’s action was ethical or unethical.
 

1	2	3	4	5	6	7
ethical				unethical		
  
- 2) The likelihood you would perform the same action.
 

1	2	3	4	5	6	7
low			high			
  
- 3) Your perception on whether your peers/colleagues would have performed the same
 

1	2	3	4	5	6	7
low			high			

**D.** Instruction: Please tick only ONE appropriate box that most accurately reflect your thought

A woman was near death from a unique kind of cancer. There is a drug that might save her. The drug costs \$4,000 per dosage. The sick woman's husband, Heinz, went to everyone he knew to borrow the money and tried every legal means, but he could only get together about \$2,000. He asked the doctor scientist who discovered the drug for a discount or let him pay later. But the doctor scientist refused. What should Heinz do?

- Heinz should not steal the drug because he might be caught and sent to jail.
- It is right for Heinz to steal the drug because it can cure his wife and then she can cook for him.
- Heinz should steal the drug. He probably will go to jail for a short time for stealing but his in-laws will think he is a good husband.
- As her husband, Heinz has a duty to save his wife's life so he should steal the drug. But it's wrong to steal, so Heinz should be prepared to accept the penalty for breaking the law.
- Heinz should steal the drug because everyone has the right to life regardless of the law against stealing. Should Heinz be caught and prosecuted for stealing then the law (against stealing) needs to be reinterpreted because a person's life is at stake.
- Heinz should steal the drug to save his wife because preserving human life is a higher moral obligation than preserving property.

**E.** Instruction : Please tick and fill where appropriate.

1. My university has specific ethic course.  
Yes  No
2. Ethic has been incorporated in other subjects.  
Yes  No
3. Have you taken any ethics courses/subjects in your current programme?  
Yes  No

If yes, please answer question 4 to 26

If no, is there any element of ethic that have been integrated in other engineering subject? Please state \_\_\_\_\_

4. How was the ethics class being conducted ?
- (i) Mass lecture (>60 student per class)
- Case study  Theoretical
- (ii)  Medium group (between 20 – 60 students per class)
- (iii)  Small group (less than 20 students per class)
5. What method do you prefer in the ethics class?
- A. Lecture  
 B. Discussion  
 C. Audiovisual methods  
 D. Experiential methods
6. Number of students in ethics class \_\_\_\_\_.
7. Number of contact hours per week in the ethics class \_\_\_\_\_.

Instruction: Please choose one of the following responses according to the scale given below for question number 8 to 26

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<i>Strongly Disagree</i>	<i>Moderately Disagree</i>	<i>Moderately Agree</i>	<i>Strongly Agree</i>	<i>Neutral</i>	<i>Does Not Apply</i>

8.  The time allotted for the course was appropriate.
9.  The course content achieved the course objectives.
10.  Ethic courses should be made compulsory.
11.  The assigned reading material (text, papers, etc) was appropriate for the course.
12.  If used, the films used by the instructor were incorporated into the course.
13.  When used, in class exercises (case study, role playing, etc) helped me understand the material.

## Appendix A1

1	2	3	4	5	6
<i>Strongly Disagree</i>	<i>Moderately Disagree</i>	<i>Moderately Agree</i>	<i>Strongly Agree</i>	<i>Neutral</i>	<i>Does Not Apply</i>

14.  Assessment procedures (paper tests, presentation etc) allowed me to demonstrate what I had learned.
15.  Tests, examination and case study were good measures of course material.
16.  Practical assignments were good measures of course evaluation.
17.  The instructors / lecturers checked to see if student were understanding the material.
18.  The instructor's /lecturer's lectures were well - organized.
19.  The instructor's / lecturer's were interesting.
20.  The instructor's/ lecturer's were informative.
21.  The instructor's/ lecturer's facilitated discussion/participation in class.
22.  The instructor/lecturer demonstrated respect for alternative viewpoints from students.
23.  The instructor/lecturer used examples in an effective manner.
24.  The instructor/lecturers encouraged students to develop their own examples.
25.  I learned a lot about how to be ethical in this class.
26.  I learned a lot about ethics in this class.

Thank You For Your Time